AMERICAN ARTISAN

NOVEMBER
1941

RESIDENTIAL AIR CONDITIONING
WARM AIR HEATING • SHEET METAL CONTRACTING

ESTABLISHED
1880

LAMNECK

AIDS DEFENSE BY SAVING

with Lamneck Prefabricated Duct and Fittings

MAN POWER

with Lamneck Gravity Pipe and Fittings

MONEY

with Lamneck Registers

TIME

with Lamneck Service

YOUR DISTRIBUTOR

Carrying as he does ample stocks to supply your needs, gives you every benefit of our varied line, volume production and engineering experience. Talk to your Lamneck distributor. He will show you how to save days and hours on every job.

LP INC.

Specify LAMNECK

LAMNECK PRODUCTS, INC., Middletown, Ohio

"KEY PEOPLE"—*When You Need Steel*

Ryerson's function is not only to supply your steel, but to deliver it on time. From the moment the Ryerson switchboard flashes your incoming call until the steel is laid down in your plant, a corps of helpful, intelligent employees well-trained in the Ryerson "Immediate Steel" tradition are at your service.

The likeable young women at the switch-board, phone-order salesmen, dispatchers, crane operators, skilled warehousemen who cut, shear and shape stock sizes to fit your specifications, truck drivers — all of them are key people at Ryerson —key people in *your* service, when you need steel!

Although the National Defense program and essential industries come first, we are putting forth every effort to serve all Industry to the best of our ability. Naturally, many sizes and certain products are out of stock. However, for the most part you can depend on Ryerson for immediate shipment of a wide range of steel products.

For best service during this period of heavy demand, "open" orders are advisable. Stock List sent promptly on request. Joseph T. Ryerson & Son, Inc., Chicago, Milwaukee, St. Louis, Detroit, Cincinnati, Cleveland, Buffalo, Philadelphia, Boston, Jersey City.

RYERSON *Certified* **STEELS**

RYERSON CERTIFIED STEELS

AMERICAN ARTISAN

WITH WHICH ARE MERGED

FURNACES AND SHEET METALS

AND

Warm-Air Heating

Covering All Activities in Residential Air Conditioning and Small Commercial Cooling, Warm Air Heating, Sheet Metal Contracting and Fabricating

J. D. Wilder, Editor — A. A. Kennedy, Assistant Editor

Vol. 110, No. 11 — November, 1941 — Founded 1880

CONTENTS

Survey of the Sub-Contracting Situation 31
A-10 Rating Assigned Maintenance and Repair 32
Defense Developments 34
Priorities, as Donald Nelson of OPM Sees Them 37
Sub-contracting Trains to Display Items Needed 39
Kruckman—Government Buying for Defense Houses 40
Association Activities 81
New Products 83
New Literature 88

RESIDENTIAL AIR CONDITIONING SECTION

Washington, D. C., Gas Heating Code (Part 3) 43
Defense House Heating (Loop and Utility Room) 46
Condensation in Chimneys 48
Konzo, Check List for "Tuning" a Furnace 51
Air Duct Friction Chart 54
Rudiments of Small Stoker Operation (Part 1) 56
Baffling Can Cure Uneven Bonnet Temperatures 60

THE SHEET METAL SECTION

Radiant Heat for Baking Organic Finishes 65
Here's That Hammer Again 68
Die Set-ups for a Small Sheet Steel Box 70
"Do's" and "Dont's" for Stainless Steel 72
Joining in Streamlined Sheet Metal Training 75
Three-Ounce Copper as a Material for Art 78

In This Issue

LETTERS, visits, correspondence indicate that the possibilities in sub-contracting defense items are attracting wide interest among the sheet metal contractors. Readers who have followed our reports in Defense Developments will recognize that sub-contracting (so far as our industry is concerned) has up to now been mostly talk—not action.

But within the last thirty days, things seem to have happened. Foremost, of course, is government's determination to split up contracts. Secondly, is the real effort to acquaint possible fabricators with the items needed and how to make them.

All this adds up to business for our readers if they can get the orders and if they can execute these orders.

With these problems in mind we have devoted the front part of this issue pretty largely to a survey and pertinent discussions or reports of what is taking place in the sub-contracting activity. Not all of this material is encouraging, but we have tried to show the situation as it really exists—from here on in the job is up to the contractor. We urge readers to study these reports carefully.

●

Two developments in the priorities picture are worthy of study. The amended P-22 which now assigns an A-10 rating to maintenance and operating needs should be definitely beneficial. A complete report of this amended P-22 appears on page 32.

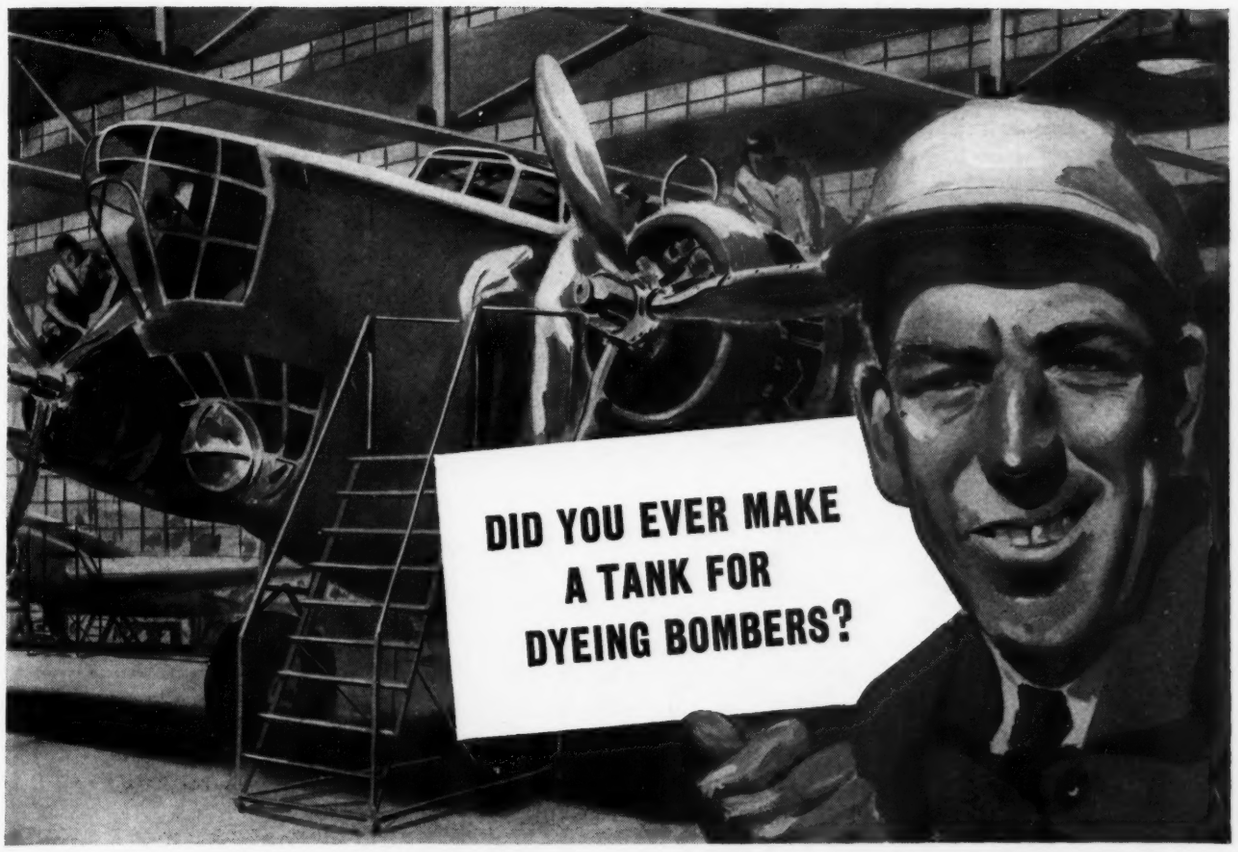
Also (page 37), Donald Nelson, OPM, explains why priority ratings are necessary and why these priorities benefit the little fellow. This address is, we believe, a straight-forward discussion and should be of interest because it surely must reflect the thinking of the powers that be.

Member of Audit Bureau of Circulations — Member Associated Business Papers, Inc.

Published monthly by Keeney Publishing Company, 6 N. Michigan Ave., Chicago, Ill., U. S. A. Copyright 1941 by Keeney Publishing Company. Advertising staff: Wallace J. Osborn, New York City, Telephone—Murray Hill 9-8293; R. Payne Wettstein, Chicago, Telephone—State 6916; Robert A. Jack, Cleveland, Telephone—Yellowstone 1540; J. H. Tinkham, Los Angeles, Telephone—Richmond 6191.

Yearly Subscription Price — U. S. and possessions, Canada, Mexico, South America, Central America, $2.00; Foreign, $4.00. Single copies, U. S. and possessions, $.25. Back numbers, $.50. January, 1941, Directory issue, $1.00 per copy. Entered as second-class matter, July 29, 1932, at the post office at Chicago, Illinois, under the act of March 3, 1879.

More than 8,000 copies of this issue are being distributed



S'pose you contractors located near textile plants know all there is to know about dye tanks. But this one I ran into on a defense job was somethin' new to me. It was a Monel tank for dyein' metal airplane parts.

It's a dye bath tank just like you would make for a textile plant. But it sure takes a powerful dye to put color on metal. The stuff they use is so corrosive it would eat out an ordinary tank in no time at all. That's why 7-gauge Monel was specified. Pretty thick sheets to work with all right, but you know how easy Monel is to handle. Wasn't any job at all to install the ¾ inch IPS Monel coil and cast Monel return bends.

Another airplane factory makin' instruments has metal tanks made of ¼ inch steel plate, but you can bet there's a linin' of 22-gauge Monel right on top of that steel. Of course, coils and fittin's are of Monel, too.

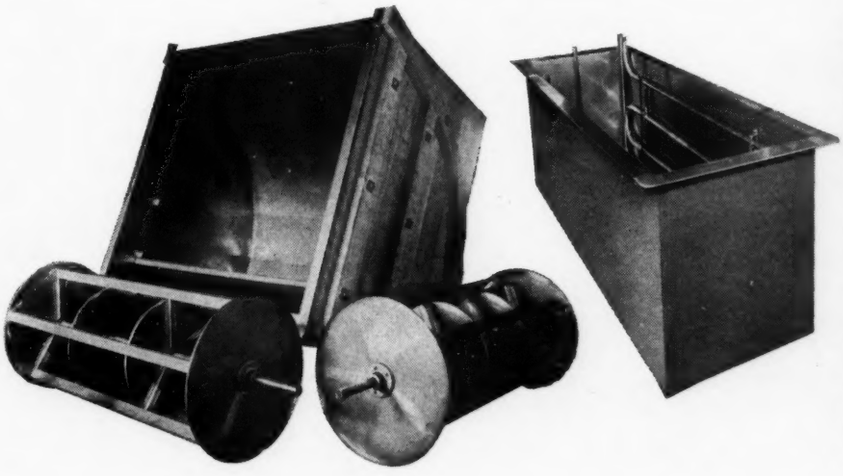
As you know, the use of Monel in dye tanks is an old story. Take the one used to dye felt for the Army. It's lined with 20-gauge Monel. The reels in the front are 36 inches in diameter, and are made from 16-gauge sheet.

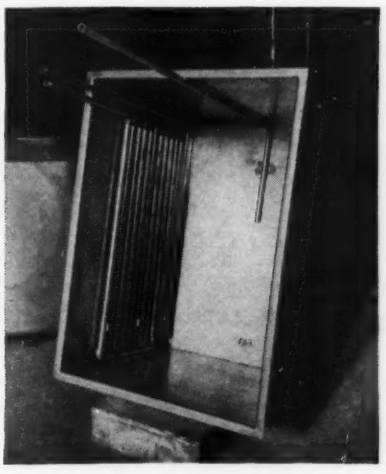
There's good reason for usin' Monel for these tough jobs. It's easy to work an' it welds like nobody's business, not to mention its well-known resistance to corrosion.

There's lots of defense jobs like these floatin' around. Just get in touch with your local O.P.M. Defense Contract Service, and get a few of them for yourself. If you guys need any more dope about workih' Monel, just write to:

Tim Shears

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street New York, N. Y.





"THANKS FOR YOUR HELP"

The Osborn Man

In the territories we serve, "the OSBORN man" is one of the sheet metal industry's most familiar figures. Selling OSBORN quality and service, he and his predecessors have called on our trade for more than half a century. This man has made a legion of friends—friends who remain loyal to us year after year because we make a sincere effort to act the same toward them.

In these days of national emergency—with their critical materials, stocks reduced by quotas and priority orders which must be filled ahead of those for non-defense purposes—"the OSBORN man" is having his troubles. Supplying his customers' needs is his, and our, job and it hurts not to be able, in some cases, to furnish the materials which are required for their work. We believe our customers know this and know, too, that we realize their welfare and ours are at stake.

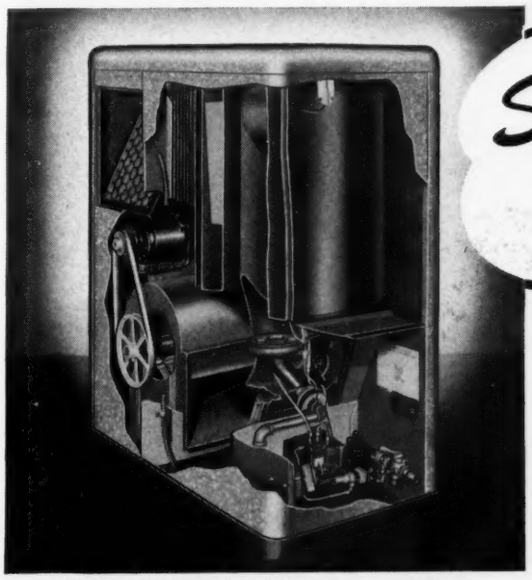
For these reasons, far more time than normally is spent on every order OSBORN receives today. Even though it may turn out that we are unable to fill some of them, we do our best to do so. That, it seems to us, is the way to show our appreciation of the cooperation you have given "the OSBORN man" who calls on you.

PRIME METAL SHEETS
EAVES TROUGH, CONDUCTOR PIPE, ETC.
ROOFINGS, NAILS AND PAINTS
FURNACES AND ACCESSORIES
SHEET METAL TOOLS
AND MACHINERY

THE J. M. & L. A.
OSBORN Co
CLEVELAND, OHIO
BUFFALO • CINCINNATI • DETROIT
Manufacturers—Distributors of Metals and Metal Products

A DEPENDABLE SOURCE OF SUPPLY FOR 82 YEARS

RYBOLT



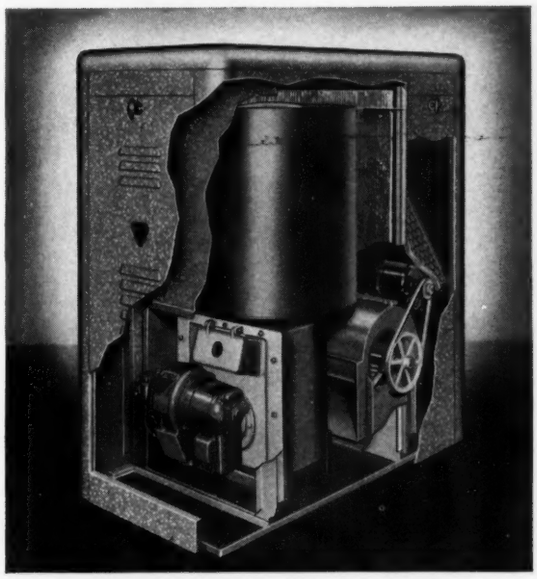
RYBOLT GAS-FIRED WINTER AIR CONDITIONER

Sized and Priced for Low Cost Housing

• Here are two new RYBOLT automatic heating units that are *sized right* and *priced right* to meet the requirements of low cost homes and defense housing. Because of their compact and ingenious design they fit into small space without any sacrifice of efficiency, convenience or accessibility. They are thoroughly modern and completely equipped with the most advanced features, yet priced low enough to fit the budget of the small or medium sized home owner.

RYBOLT GAS-FIRED UNIT
Ideal for Small or Medium Sized House

The compact RYBOLT Series RS Gas-Fired Winter Air Conditioner embodies many improved features to insure comfortable even heat with utmost convenience and economy. Double protection gas valve control assures safe operation under all conditions. Complete with quiet running blower, automatic humidifier, room thermostat and Dust-Stop filters. Handsome baked enamel finished cabinet. Shipped completely assembled which materially reduces handling time for jobbers and dealers. Also means big saving of installer's time because he will not have to assemble unit on the job.



RYBOLT OIL-FIRED WINTER AIR CONDITIONER

RYBOLT OIL-FIRED UNIT
Meets Today's Space Limitations

This unit is sized to fit into minimum space with no sacrifice of efficiency or high quality performance. Completely automatic, quiet in operation, fully dependable. Pull-out feature of the oil burner makes it extremely easy to service. Burner, controls and blower are completely concealed yet easily accessible. Complete with quiet running blower, Dust-Stop filter, automatic humidifier, room thermostat. Handsome cabinet finished in baked enamel.

rh
TRADE MARK

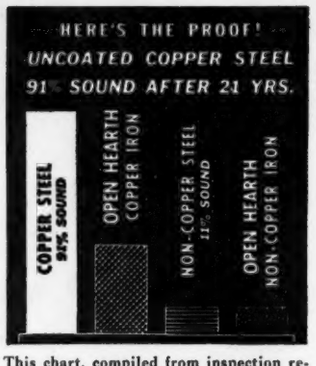
NOTICE TO JOBBERS

Under present conditions our production capacity is taxed to the limit to meet the requirements of our regular customers to whom we feel we owe first consideration. In justice to them, therefore, and also because we desire to cooperate to the fullest extent with the National Defense Program, we do not feel free at this time to consider any new distribution outlets, much as we appreciate the requests which we have been receiving.

THE RYBOLT HEATER COMPANY
615 MILLER STREET • ASHLAND, OHIO

U·S·S COPPER STEEL SHEETS

last longer ...easier to fabricate!



This chart, compiled from inspection reports of the Committee on Corrosion of Iron and Steel, A.S.T.M. Proceedings 1937, shows results of atmospheric corrosion tests carried on at Annapolis, Md., from 1916 to 1936. After 21 years' exposure, 91% of COPPER STEEL sheets remained "sound" (unperforated). Other materials were decidedly inferior.

U·S·S Copper Steel Sheets have four outstanding qualities that make them the first choice of many leading sheet metal workers and fabricators. First, sheets of U·S·S Copper Steel are easy to fabricate—they make possible true bends, tight seams and neat joints—saving time and money on the job. Second, they have two to three times the resistance of plain steel to atmospheric corrosion. Third, they have superior resistance to corrosion caused by smoke, gases and chemicals. And fourth, the added cost of U·S·S Copper Steel Sheets is so low that it makes little difference in the completed installation or fabricated product.

U·S·S Copper Steel Sheets are unusually uniform in gage, size and working characteristics — they are manufactured in both galvanized and hot rolled grades. Write to one of the companies below for our free booklet of helpful information.

U·S·S COPPER STEEL SHEETS

CARNEGIE-ILLINOIS STEEL CORPORATION, *Pittsburgh and Chicago*
COLUMBIA STEEL COMPANY, *San Francisco*
TENNESSEE COAL, IRON & RAILROAD COMPANY, *Birmingham*

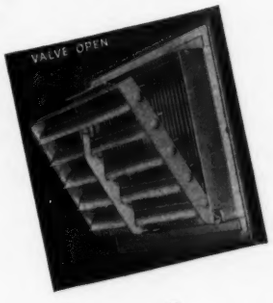
Scully Steel Products Company, Chicago, *Warehouse Distributors* · United States Steel Export Company, New York

UNITED STATES STEEL

For that PLUS PERFORMANCE—

Obtainable with registers of no other make

Use H&C No. 75 *with the* TURNING BLADE VALVE



Current catalogs: No. 41 (Gravity) and No. 41 AC (Air Conditioning). If not on hand write us, asking to be put on our mailing list.

IF you have never tried the No. 75, there's a revelation in store for you when you do. It provides better distribution to the farthest parts of the room, eliminates cold spots and draft sensations; cuts down resistance to an unprecedented minimum. In short, it gives you a PLUS in performance which is obtainable only with the H & C Turning Blade Valve—a PLUS that counts heavily in making boosters out of customers. Yet No. 75 costs no more than conventional directional registers. Try H & C No. 75 Registers on your next job and you'll always use them.

HART & COOLEY MANUFACTURING CO.

Warm Air Registers • Air Conditioning Grilles • Damper Regulator Sets • Dampers • Chain • Pulleys

HOLLAND H&C MICHIGAN

Chicago Office: 61 W. Kinzie St. Philadelphia Office: 1600 Arch St.

Western Representatives: John T. Rowntree Co., Los Angeles, San Francisco, Portland, Seattle, Salt Lake City, Denver

THE LAU BLOWER CO.

We Will be Loyal to Both Our Customers—

THE NATIONAL DEFENSE PROGRAM AND YOU

In these days, we all have one paramount loyalty . . . to be of utmost assistance in America's National Defense Program.

To this end, we at the Lau Blower Co. are making every effort to do our part. Our plant and manufacturing facilities have been expanded in recent months that we might accept today's greater Defense responsibilities.

But we have another loyalty, too . . . our loyalty to you, our customers. With priority certificates being received on a large percentage of our business, we have been fortunate in being able to obtain materials necessary to fulfill our defense obligations, and still continue to supply your needs.

Your loyalty to us always has been, and always will be appreciated. You can help us continue to show our loyal appreciation to you by anticipating your needs as far in advance as possible. Write for prices and deliveries on Lau blowers and blower filter units, today.

THE LAU BLOWER CO.

Home Avenue, Dayton, Ohio

THE U. S. GOVERNMENT AND YOU . . .

LAU DELIVERS!

Great Institution, isn't it?

"Mister & Missus"—a new partnership—set up under one name! These folks don't know it, but it was the same general idea that helped them decide what brand of automatic heating they needed for their new home.

There's a New Leader in the Control Field

The salesman offered them only one product and one name—controls and all. He concentrated his story on the completely assembled unit. Because his sales arguments were united, they produced a single reaction and a signed order.

No chance for the prospect's mind to wander when you hold to a single, unified sales objective. No chance for confusion, misunderstanding or doubt when you sell one name and one name only. That's not a new discovery; experienced salesmen—the record breakers—have always done it that way.

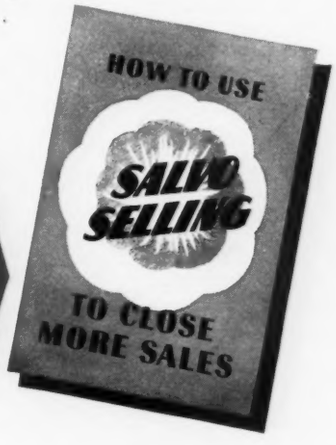
"Salvo Selling" is a booklet which outlines this proved, successful selling technique. You may have a copy, free, simply by writing for it. If you want to raise your selling percentage, better drop us a note or a postcard—right now.

PERFEX CORPORATION

500 West Oklahoma Avenue, Milwaukee, Wisconsin

SEND FOR THIS FREE BOOK

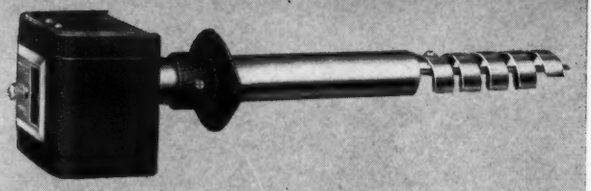
If you are selling automatic heat, you will find it profitable to read this explanation of the methods used by the successful closers. A copy is yours for the asking.



New Improved

WARM AIR HEATING CONTROLS

CA-815 COMBINATION BLOWER AND LIMIT CONTROL



Located in the plenum chamber or duct of a warm air furnace installation, this control automatically governs the blower to prevent the circulation of cold air and also to stop the burner if plenum temperature exceeds a safe maximum. It is readily adjustable for any control temperatures desired.

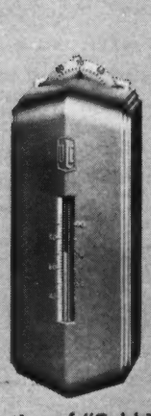
The CA-815 is sturdily constructed. The snap-switch assemblies are enclosed in a bakelite case and can be changed in the field with ease. Approximate temperatures are clearly indicated on a dial visible through a window in the cover. This same construction is available in models for straight limit control or for blower control. Also in long or short shank types.

CA-383 STOKER TIMER

The No. CA-383 is a "Stand-by" control used to maintain stoker fire by periodic, short interval firing, the length of the firing period being adjustable up to 12 minutes on a 30 minute cycle.

Timers having a 60 minute cycle can be supplied when necessary. Either long or short cycle timers may be readily changed in the field from one cycle to the other. The gear reduction of this instrument is sealed in an oil bath, and consequently never requires additional lubrication or attention. Cam gear turns at but 6 revolutions per hour which eliminates gear wear.

No. 411 ROOM THERMOSTAT



The No. 411 is a modernly styled and very sensitive thermostat for the control of heating installations. It is available either with or without compensation (preheater). Compensation assures a constant temperature, the elimination of "Cold 70" and the extra cost of overheating. One unit handles all conditions merely by adjusting the preheater element. This element never has to be exchanged. A separate mounting plate makes installation and wiring extremely simple.

DETROIT LUBRICATOR COMPANY

General Offices: DETROIT, MICHIGAN

Canadian Representatives—RAILWAY AND ENGINEERING SPECIALTIES LIMITED, Montreal, Toronto, Winnipeg

U.S. Registers and Grilles for U.S. Home and Defense Projects

ACCLAIMED BY ALL HEATING CONTRACTORS who have installed them to be "Superior to any type of Register they have ever set."

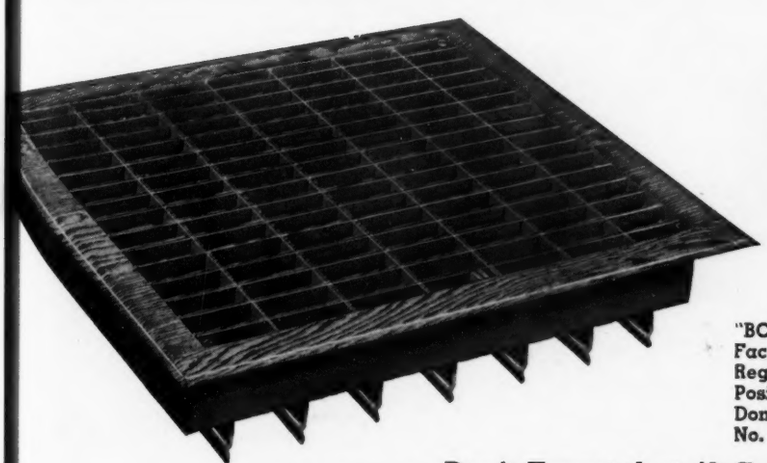
U. S. No. 40 SERIES

Gravity Baseboard Registers

The Leader in Standardized Gravity Baseboard Registers. More Free Area . . . Less Resistance . . . Definite Non-Vision . . . Two-Piece Construction . . . Metalac Finish Featured at Black Japan List . . . These and Many More Superior features make the No. 40 LINE Excel All Others.

SEND FOR NEW 41-G Gravity Register Catalog

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★



NEW No. 400 1942 MODEL

U. S. TRUSSTEEL FLOOR REGISTER

No. 405 Cold Air Faces to Match

The New No. 400 Floor Register presents the FIRST REAL REGISTER "BOTTOM" Improvement in Register History. No Slot for Lever in Register Face . . . Operation most Powerful and Efficient of any floor register . . . Register Valves running short-way don't shoot air-streams against sidewalls. Positively the tightest fitting and most perfect operation of register valves. Don't be fooled by closer meshes which reduce free area—Insist on U. S. No. 400—82% Free Area.

Don't Forget that 41-G Gravity Catalog—that 41-AC Air-Conditioning Catalog — Mailed same day to you.

US

UNITED STATES REGISTER CO.

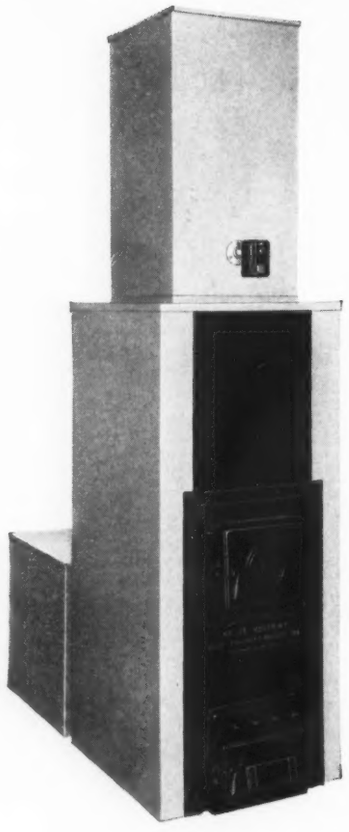
BATTLE CREEK, MICHIGAN

MINNEAPOLIS • KANSAS CITY • ALBANY • SAN FRANCISCO • NEW YORK, N. Y.

CANADIAN MANUFACTURING DISTRIBUTORS—Canada Register & Grille Co., Toronto, Ontario

MONCRIEF

★ UNITS ★ *for* DEFENSE HOUSES



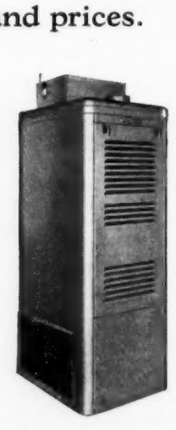
NEW
No. 16 FORCED AIR
Coal-Fired
HEATING SYSTEM

Cast 16" furnace with dome radiator. Very compact and efficient; 60,000 B.t.u. at registers; cabinet 26" x 26" x 7'3" high; blower cabinet 24" x 24". Electric driven blower produces forced air circulation, adapting it to basementless homes. Attractively finished. Priced right down to rock bottom.

Just the right sizes and just the right prices to meet defense housing specifications. Top quality construction all through and designed to please the eye, too. Write or wire for descriptive circulars and prices.

Series C Cast Furnaces; 18", 20" and 22" sizes.

"Utility" Oil-Fired Winter Air Conditioner 65,000 B.t.u. capacity.



Vertical Type Gas-Fired Winter Air Conditioner 70,000 and 85,000 B.t.u. capacity.

THE HENRY FURNACE & FDRY. CO., 3473 E. 49th St., Cleveland, Ohio

Keep industry rolling for defense

with *Randall*

PILLOW BLOCKS

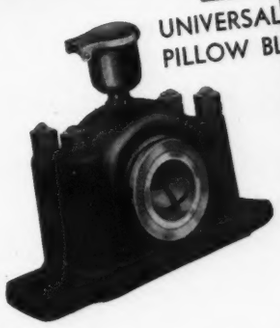
★ ***The vital production*** of America's defense equipment *must* be kept moving. Industry must keep up the swift pace . . . or defense will falter.

★ ***Randall shoulders its share*** of the defense load. Mobilized for defense, it is devoted to keeping American industry vigorously on the move. Just as the nation's fighting strength defends our land and its shores, Randalls effectively guard your equipment from bearing failure under every condition.

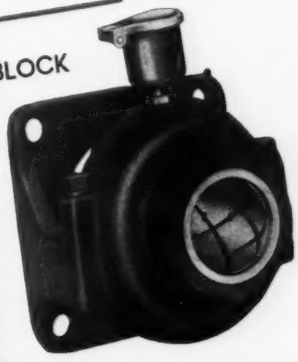
★ ***Built to step up*** and maintain America's defense production, Randall self-aligning, self-lubricating Pillow Blocks are rugged, durable, and they effectively withstand severest operating conditions. They are quiet in operation, low in original cost, and economical to use throughout their long trouble-free life. Write today for catalog of Randall's complete line of efficient pillow blocks.

ONE-PIECE STEEL HOUSING PILLOW BLOCK

UNIVERSAL PILLOW BLOCK



FLANGE OR SIDE MOUNT PILLOW BLOCK



Representatives Carrying Stocks

C. W. Marwedel
San Francisco, Cal.

Salt Lake Hardware Co.
Salt Lake City, Utah

Edward D. Maltby Co.
Los Angeles, Cal.

Tek Bearing Co.
177 Lafayette, New York City
1192 Commonwealth Ave., Boston, Mass.

RANDALL GRAPHITE PRODUCTS CORPORATION

DEPT. 1111 **609 W. LAKE ST.** **CHICAGO, ILL.**

We Are Already Thinking Of The Days When Materials Will Again Be More Than Plentiful!

"Circumstances beyond our control" have decreed that today's supply of Handy pipe shall be inadequate to your wants. We are doing our best—working harder than normal conditions ever required—but we can't make two sections out of material for one.

However, we are not forgetting the dealers and contractors who made it possible to build this business—the dealers and contractors to whom we will be looking in future years to consume all the products we can possibly make.

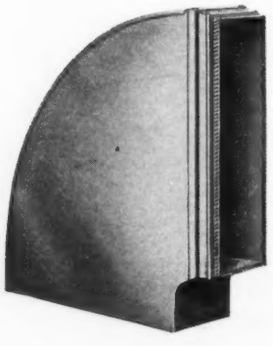
To you we say:—we will keep the faith—and when the day dawns that American industry can again turn to peaceful pursuits, we will be the first to produce "the mostest of the bestest."

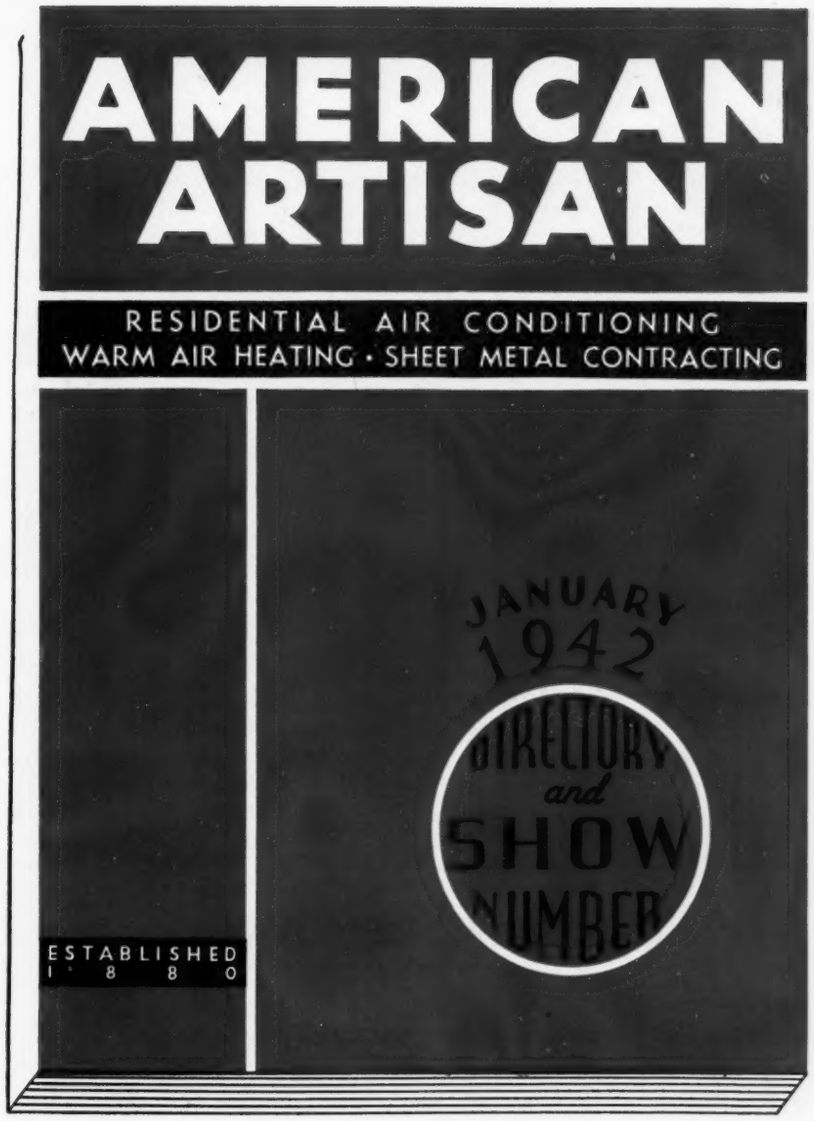
Meanwhile our plant is working at top speed —filling orders as quickly and as rapidly as possible.

F. Meyer & Bro. Co.

"The Handy Pipe People"

PEORIA ILLINOIS





READY IN JANUARY

AMERICAN ARTISAN'S *Annual* DIRECTORY *and* SHOW NUMBER

"One of the biggest—definitely the best"

THE January 1942 issue of AMERICAN ARTISAN will, as usual, contain the ORIGINAL, COMPLETE Directory of the field inaugurated eleven years ago. In addition, it will contain the Show section of the International Heating and Ventilating Exposition at Philadelphia, complete with all listings and directions of what is to be displayed at the Show and where to find it.

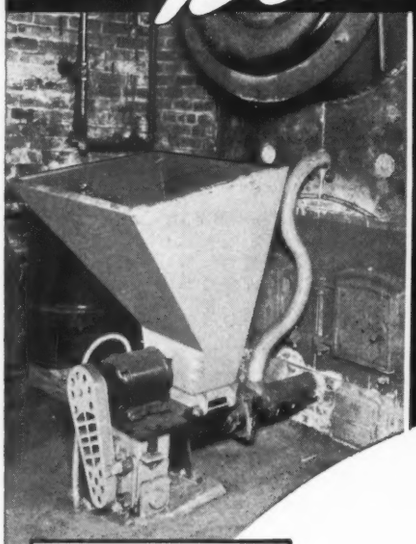
The Directory will serve throughout the year as a reliable guide for dealers and contractors looking for sources of supply for all types of equipment used in the field. For manufacturers, it will offer an unparalleled opportunity to reach the men who "count" in the field. Those who specify and buy various types of equipment . . . and all at NO ADDITIONAL COST! Regular space rates apply!

It will pay you well to take liberal space in this issue . . . show your complete line . . . get ALL your message to ALL your prospects at the same time in the January 1942 Directory and Show Number of AMERICAN ARTISAN.

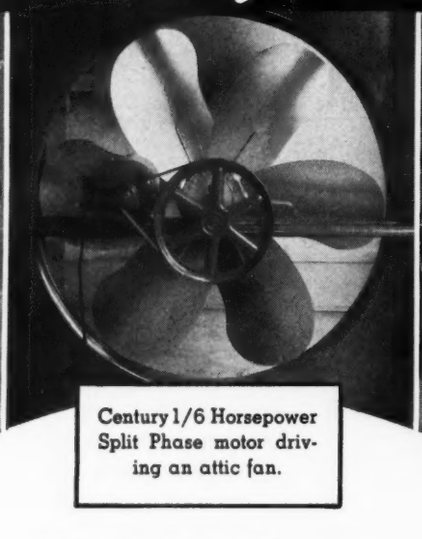
Send us your space reservation today . . .

AMERICAN ARTISAN
6 North Michigan Avenue Chicago

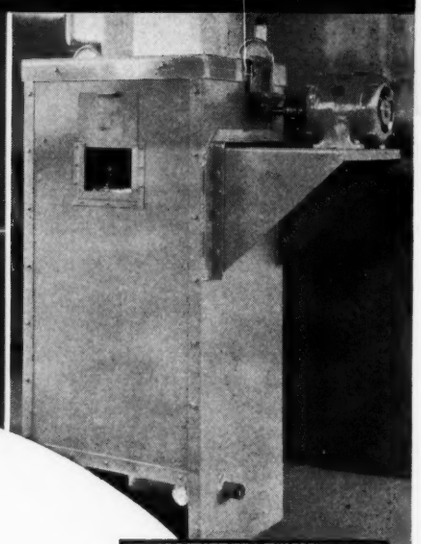
INTERESTED IN *Better Performance?*



Century ½ Horsepower Repulsion Start induction motor driving a stoker.



Century 1/6 Horsepower Split Phase motor driving an attic fan.



Century 1 Horsepower Squirrel Cage induction motor driving a room cooler.

Then Select
CENTURY MOTORS
For Every Air Conditioning Need

● You can't expect the most effective performance from your air conditioning installations unless you're sure they are equipped with the right electric motor drives. That's where Century Motors can be of real service to you, because they are especially designed and engineered to meet practically every air conditioning requirement.

Century Motors not only meet the starting, accelerating, and running requirements of your equipment, but they are also designed to operate continuously in a variety of unusual surrounding atmospheres. They are available in a wide variety of types, sizes, and characteristics — fractional and integral horsepower.

Let the complete line of Century Motors for your industry help you to *obtain and maintain top performance* from every installation — for they meet the demands of blowers, fans, stokers, unit heaters and coolers, refrigeration compressors — smoothly, quietly and efficiently.

There's a Century Motor Specialist in each of 31 branch offices. Call in the one nearest you for a helpful, profitable consultation.

CENTURY ELECTRIC COMPANY
1806 Pine Street St. Louis, Mo.
Offices and Stock Points in Principal Cities

Century MOTORS

231

One of the Largest Exclusive Motor and Generator Manufacturers in the World

'CHRYSLER AIRTEMP DEALERS MAKE MONEY"

-12 Months a Year!

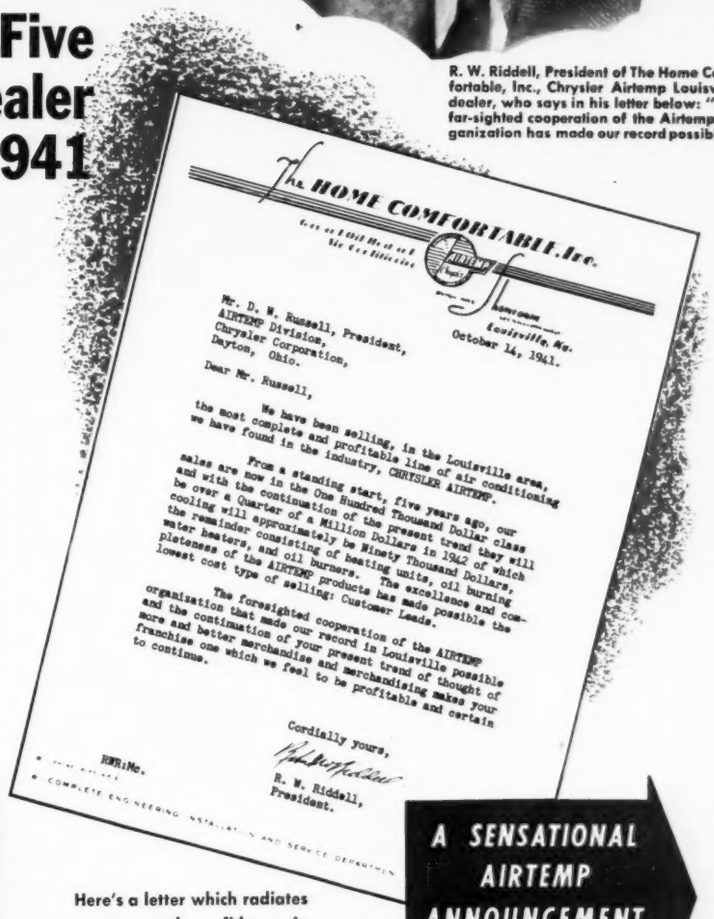
R. W. Riddell, President of The Home Comfortable, Inc., Chrysler Airtemp Louisville dealer, who says in his letter below: "The far-sighted cooperation of the Airtemp organization has made our record possible."

"From a Standing Start Five Years Ago," Louisville Dealer Hits $100,000 Sales in 1941

$250,000 IS GOAL FOR '42 COOLING SALES INCREASING

In 1936 R. W. Riddell organized The Home Comfortable, Inc. He took on the Chrysler Airtemp line because it was "*the most complete and profitable line of air conditioning*" he could find in the industry! In a letter to D. W. Russell, Airtemp President, reproduced at the right—Mr. Riddell tells how completely satisfied and pleased he and his associates are with their factory connection. In five years from a standing start, they have built a $100,000-a-year volume in Airtemp equipment. He expects his sales to reach a quarter of a million dollars in 1942! And note that next year he expects to sell some $90,000 worth of Airtemp *summer* air-conditioning equipment—36% of his estimated sales volume! The reason for Riddell's success? "The excellence and completeness of the Airtemp line . . . the lowest-cost type of selling—customer leads"—plus good merchandising!

Airtemp dealers make money because they have a complete line, made and warranted by one responsible manufacturer —and every effective advertising and merchandising aid!



The HOME COMFORTABLE, Inc.

Louisville, Ky.
October 14, 1941.

Mr. D. W. Russell, President,
AIRTEMP Division,
Chrysler Corporation,
Dayton, Ohio.

Dear Mr. Russell,

We have been selling, in the Louisville area, the most complete and profitable line of air conditioning we have found in the industry, CHRYSLER AIRTEMP.

From a standing start, five years ago, our sales are now in the One Hundred Thousand Dollar class and with the continuation of the present trend they will be over a Quarter of a Million Dollars in 1942 of which cooling will approximately be Ninety Thousand Dollars, the remainder consisting of heating units, oil burning water heaters, and oil burners. The excellence and completeness of the AIRTEMP products has made possible the lowest cost type of selling: Customer Leads.

The foresighted cooperation of the AIRTEMP organization that made our record in Louisville possible and the continuation of your present trend of thought of more and better merchandise and merchandising makes your Franchise one which we feel to be profitable and certain to continue.

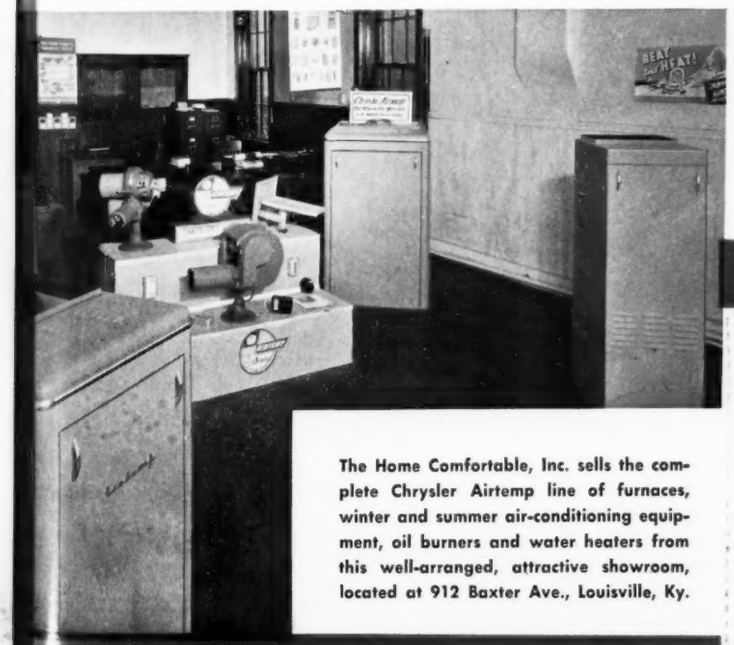
Cordially yours,

R. W. Riddell,
President.

RWR:Mc.

Here's a letter which radiates success—and confidence in the future of the Airtemp line.

A SENSATIONAL AIRTEMP ANNOUNCEMENT ON NEXT PAGE!



The Home Comfortable, Inc. sells the complete Chrysler Airtemp line of furnaces, winter and summer air-conditioning equipment, oil burners and water heaters from this well-arranged, attractive showroom, located at 912 Baxter Ave., Louisville, Ky.

CHRYSLER AIRTEMP

AIRTEMP DIVISION OF CHRYSLER CORPORATION • DAYTON, OHIO

MAIL THIS CARD AND GET THE FACTS!

AIRTEMP DIVISION, DEPT. AA-11
Chrysler Corporation, Dayton, Ohio

GENTLEMEN:

Please send me the Chrysler Airtemp Proposition for dealers.

Name _____

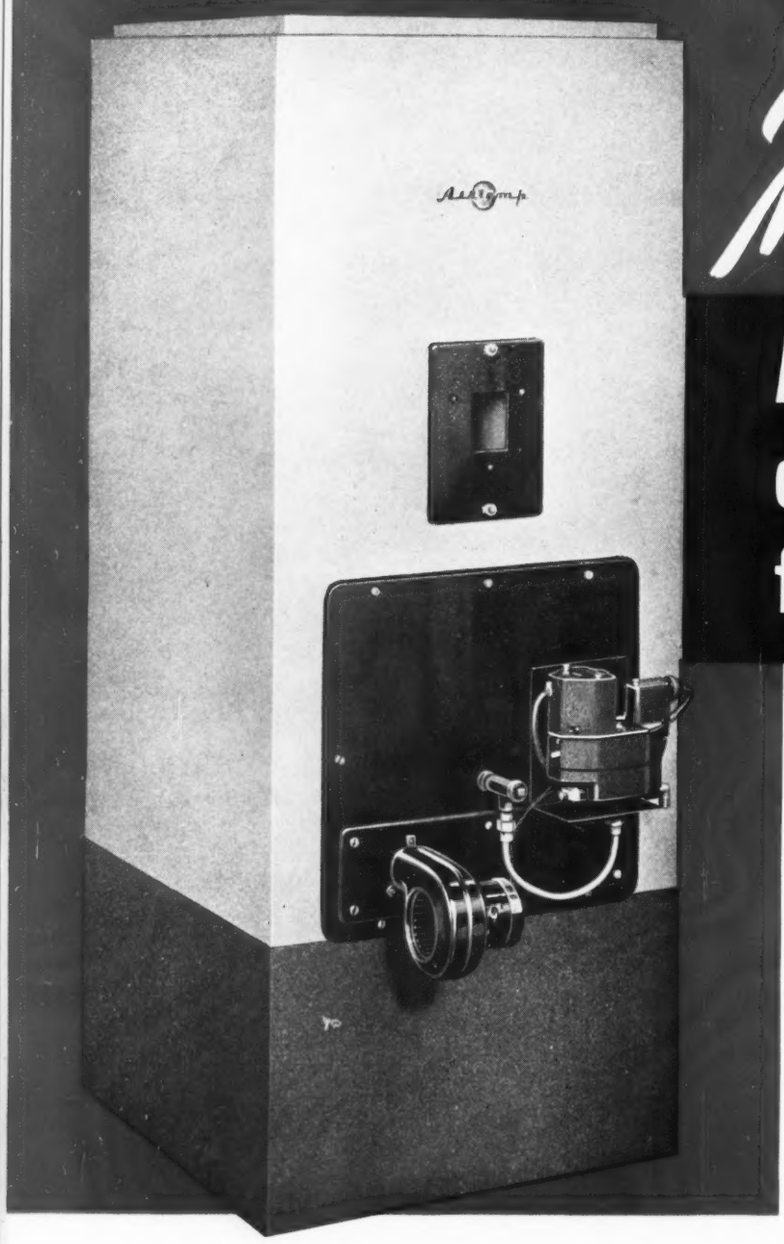
Address _____

City _____ *State* _____

AND NOW AIRTEMP ANNOUNCES A NEW

Profit-Making Model for Dealers

A low-cost Oil Furnace designed especially for defense homes



Here's the sensational, new, low-cost, automatic furnace that opens a "gold mine" market to Chrysler Airtemp dealers! You will be surprised at the price which Airtemp engineering and Airtemp mass production permit on this compact, beautifully-finished model.

Airtemp's new Vapor-flame Furnace opens up a vast *new* market—the country's *largest* heating market—to Airtemp dealers. The government estimates that during the next 12 months 600,000 new low-cost homes must be built! And there are more than 31,000,000 one- and two-family homes in the United States without automatic heat! What a need there is for a well-engineered, low-cost automatic furnace like this! The Vapor-flame Model is the product of Chrysler laboratories and Chrysler engineering—warranted by Chrysler Corporation. Airtemp dealers are going to get their share of the heating business in their communities this coming year! And they will deserve it!

With This New Profit-Making Model You Can Sell—

(1) AUTOMATIC HEAT, or
(2) FORCED-AIR HEAT, or
(3) WINTER AIR CONDITIONING

And here is wonderful news! At a cost of but a very few dollars extra, the new Chrysler Airtemp low-cost Vapor-flame Furnace can be converted into a forced-air furnace—or a complete winter air-conditioner! A standard unit containing a propeller-type fan or a centrifugal blower and filter is quickly and inexpensively added. What a selling argument for Airtemp dealers! Want more facts?

Postage Will Be Paid by Addressee

BUSINESS REPLY CARD
First Class Permit No. 885, Sec. 510, P.L.&R., Dayton, Ohio

No Postage Stamp Necessary If Mailed in the United States

AIRTEMP DIVISION, Dept. AA-11

Chrysler Corporation

DAYTON, OHIO

SEND THIS CARD for the complete Airtemp proposition!

CHRYSLER AIRTEMP

AIRTEMP DIVISION OF CHRYSLER CORPORATION • DAYTON, OHIO

SEE OUR EXHIBIT AT THE 7TH INTERNATIONAL HEATING AND VENTILATING EXPOSITION

4 MINUTES AND 22 SECONDS

14 SECONDS!

FACTS: Using a Lockformer, it took one man exactly 14 seconds to make the Pittsburgh Lock on this duct. Using a hand brake, it took two experienced sheet metal men 4 minutes and 22 seconds! This sensational savings in time and labor costs means substantially increased profits—profits that pay for the Lockformer quickly .... and then continue as "added dividends" year after year.

The Power Flanger Attachment and Auxiliary Drive Cleat and Double Seam Rolls still further widen the Lockformer's usefulness—further increase its money-making ability.

PROOF: If your shop does any duct work at all, we can prove that "getting along without a Lockformer" is an expensive proposition—is actually costing you money! How will we prove it? By a five minute demonstration in your own shop (with you as the operator) and by taking your figures as to the amount of work you handle. Send the coupon today—and find out!

Lockformer Company
4615 Arthington St., Chicago, Ill.

Gentlemen: ( ) I'd like a demonstration—
( ) send me more information.

Name .....

Address .....

City ..... State.....

THE LOCKFORMER CO.

4615 ARTHINGTON STREET, CHICAGO, ILLINOIS

DURABILT

Floor Registers and Cold Air Faces

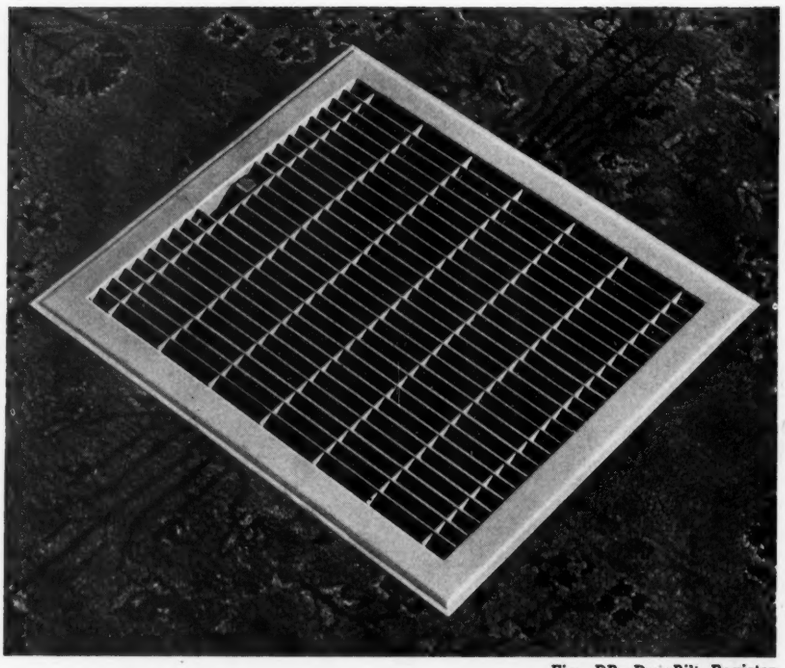
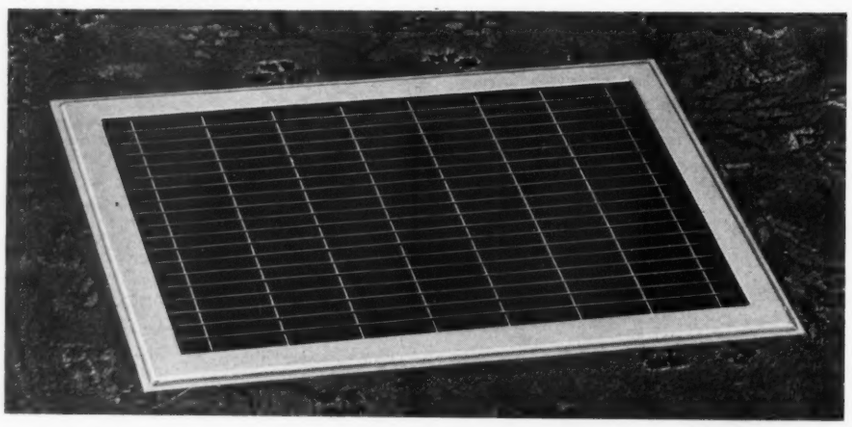


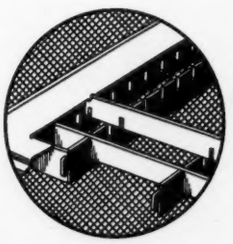
Fig. DR—DuraBilt Register

These registers and intakes are accurately assembled with heavy flat steel bars, mortised and interlocked at every cross-joint. This grille assembly is tenoned and locked tightly into welded and reinforced frame, making a highly rigid and durable construction. Open area is 81%.

Now furnished in narrow mesh as standard for all sizes, Auer DuraBilt Floor Registers and Cold Air Faces offer you a still finer product, both in appearance and service. The 7/16" by 1 15/16" opening is heel-proof, excludes small objects such as chair legs, and also tends to conceal the register box interior. For maximum structural strength—use DuraBilt Registers and Intakes.

Fig. DSC—DuraBilt Cold Air Face





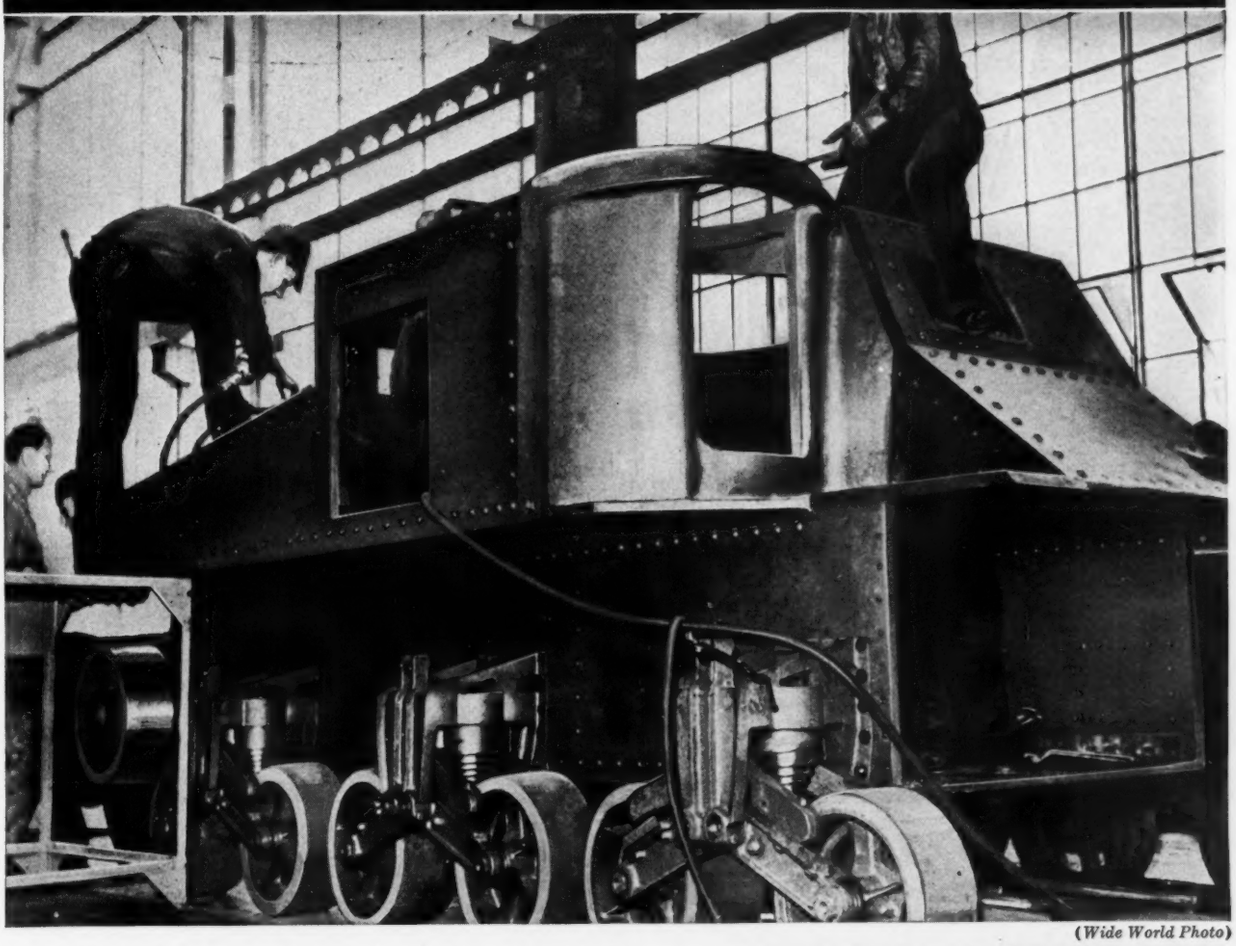
Write for complete Auer Register Book 41, illustrating and listing all types and models for both air conditioning and warm air systems. Special Grille Catalog "G" also sent on request.

The Auer Register Co., 3608 Payne Ave., Cleveland, Ohio

AUER REGISTERS

& GRILLES · For Air Conditioning *and* Gravity

Where trustworthy tools are vital

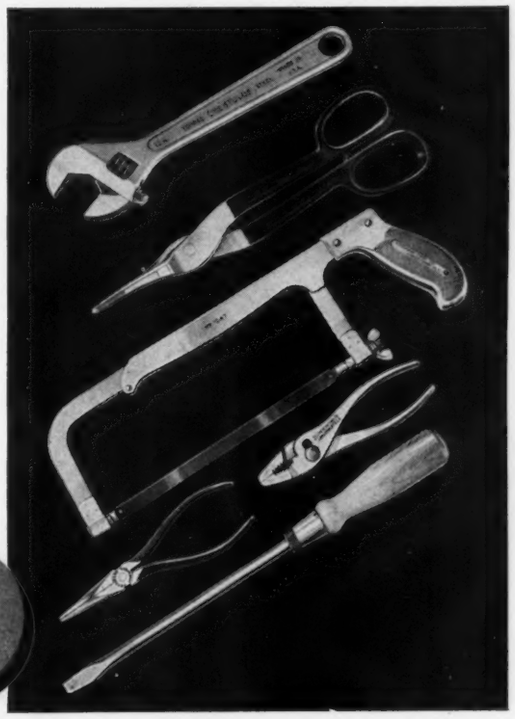


(Wide World Photo)

Not all defense plants make tanks and guns, but in practically all of them, you'll find Crescent Tools in the hands of the mechanics and craftsmen who are building the fighting tools for our Army and Navy. In War, as in Peace, trustworthy tools are vital to insure quality workmanship and to maintain schedules. Good tools, like those which have carried the name CRESCENT for 35 years, pay dividends in time and work — that's why they are so widely preferred by both management and mechanic.

Crescent Tools include adjustable wrenches, pliers of all types, hacksaws, snips, screwdrivers, etc., etc. They are sold under the "Crescent" and "Crestoloy" trade names by hardware dealers and industrial distributors everywhere.

CRESCENT TOOL COMPANY, JAMESTOWN, N. Y.

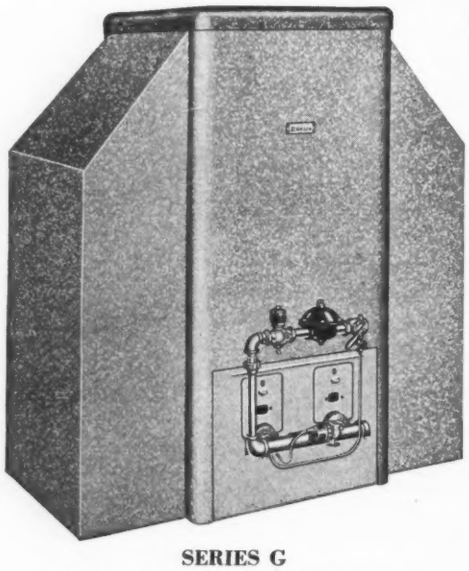


YOU CAN ALWAYS DEPEND ON

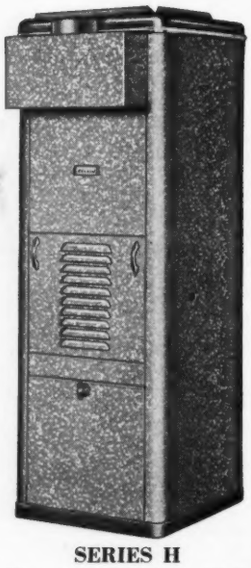
CRESCENT TOOLS

JOIN THE VICTORY PARADE IN SALES

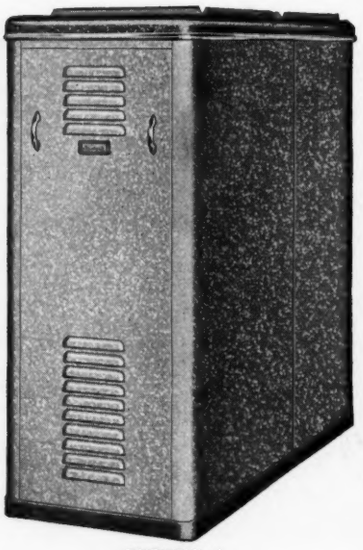
WITH Luxaire GAS EQUIPMENT



SERIES G
Gas Fired Gravity Warm Air Furnace



SERIES H
Gas Fired Air Conditioner Hi-Boy



SERIES A
Gas Fired Air Conditioning Unit

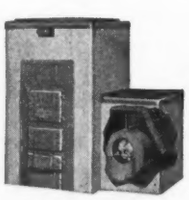
Yes . . . You too, can join the Victory Parade in sales, with Luxaire Gas Fired warm air heating and air conditioning equipment.

The Series G Gravity Furnace and Series H Hi-Boy Air Conditioner are in popular demand for Defense Housing.

Never before has a greater opportunity presented itself for the sale of warm air heating equipment. Now is your opportunity to cash in on it with the sale of Luxaire, which offers you for prompt delivery, a complete line of highly efficient, economical gas fired heating and air conditioning equipment for all types and sizes of homes.

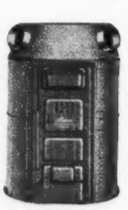
Heating elements are soundly engineered and constructed of steel throughout. Cabinets are beautifully finished in two-tone green hammerloid enamel.

Whether you need coal, oil or gas fired units the complete Luxaire line will help obtain the order.



SERIES AC 700
Coal Burning Hand Fired Air Conditioning Unit, available in Stoker models.

SERIES 8000
Oil Burning Air Conditioning Unit. Compact—Efficient.



SERIES 600
Coal Burning Hand Fired Gravity Furnace. A leader in its field.

SERIES 720-S
Defense Housing Forced Air Furnace—Coal Fired.

THE C. A. OLSEN MANUFACTURING COMPANY, ELYRIA, O.

SPECIALIZING IN DEFENSE HOUSING EQUIPMENT

50 Years of Progress

PEERLESS now begins its 50th year of business. During this expanse of time, Peerless has grown to its present size entirely by its own resources, without amalgamations, consolidations or mergers. The management of the company has been and still is directed by those identified with the founders of the business.

In fifty years, Peerless has passed through the national periods of war, prosperity, depression, political and economic upheavals and rejoices that it has been able to serve its customers through many trying times.

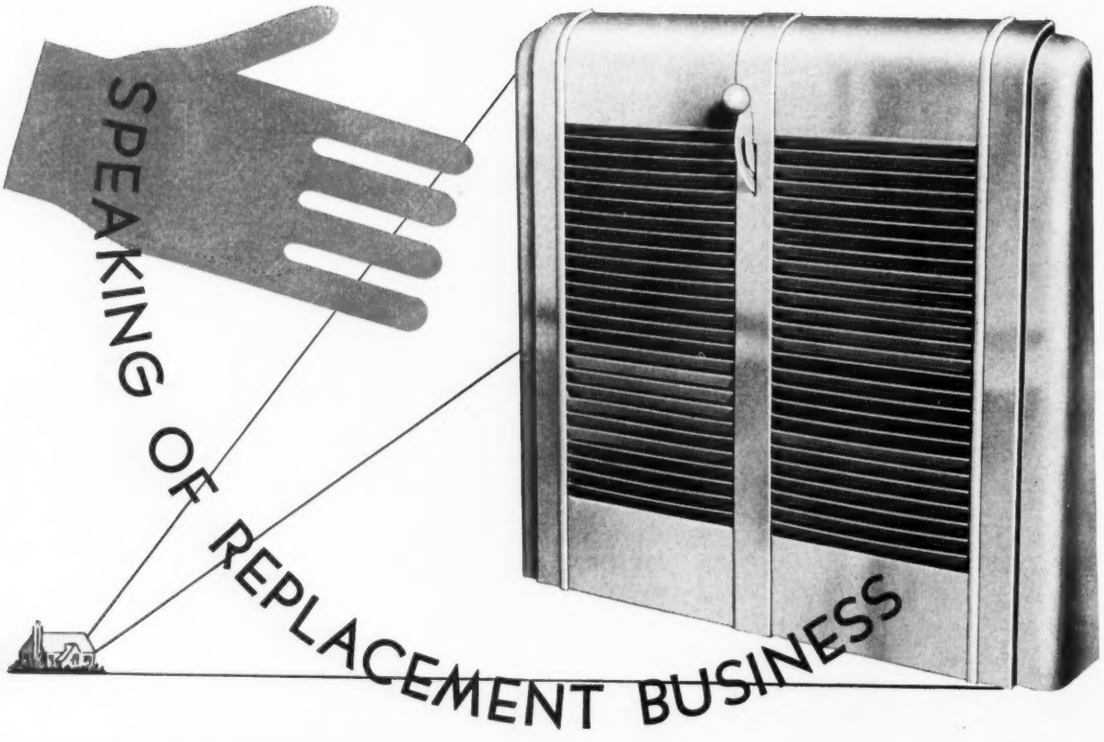
Today, new demands are being made upon us as on all others. Priorities determine to whom and when we shall ship Peerless products. This makes it difficult, sometimes, to supply our old friends of long standing in the same full measure that we have in the past.

But the experiences of 50 years have proved that there always dawns a brighter day. Until that morning breaks —and after, too—we propose to meet your requirements to the best of our ability. All we ask is that you bear with us when immediate shipments cannot be made.

Ralph Krochle
PRESIDENT

THE PEERLESS ELECTRIC CO. • WARREN, OHIO

MOTORS • FANS • BLOWERS



AIR CONTROL *Gravity Registers* ARE THE ANSWER!

AIR CONTROL Gravity Registers are ideal for replacement and modernization business. These modern, smartly styled registers not only give a modern, up-to-date appearance to a remodelled heating system, but also give increased efficiency. The popular Metalescent finish harmonizes with all interior finishes, the fin type construction masks the duct opening, the sponge rubber gasket seals against air leakage—preventing streaked walls, and the pleasing lines of the AIR CONTROL Gravity Registers blend into the wall—making the registers inconspicuous.

The fins may be easily adjusted for draftless air distribution where a fan or new forced air furnace is added. The dimensions of these registers are such that they will fit into old openings without cutting and fitting.

AIR CONTROL Gravity Registers are inexpensive, easy to install, easy to sell—modernize your replacement jobs with AIR CONTROL Gravity Registers! They will increase your dollar volume and profits!

See your AIR CONTROL Jobber to-day!

OTHER AIR CONTROL PRODUCTS— *Three complete lines of Air Conditioning Registers and Grilles—Dual Control Type—Low Cost Directional Flow Type—Horizontal Fin Type. "Better Built" Floor Registers and Faces. Attic Louvers. Damper Control Sets.*

AIR CONTROL PRODUCTS, INC.
MUSKEGON MICHIGAN

Heat for DEFENSE HOUSING

Meet government defense housing specifications with these

FITZGIBBONS

units for all conditions- all fuels - all needs

WARM AIR FURNACE 80 FWA

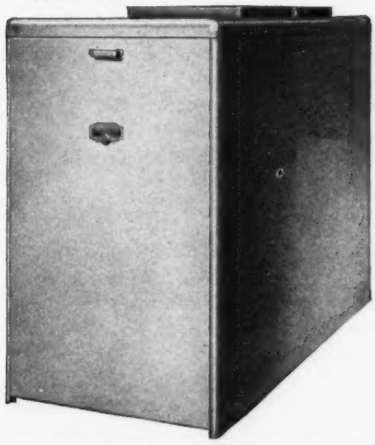
For hand firing with coal. Automatically controlled blower provides forced circulation of warmed air. Designed in accordance with the specifications set up by the Procurement Division of the U. S. Treasury Department, meeting the requirements of FWA, USHA, PBA and FSA for Defense Housing. Fitzgibbons "Weldseal" construction positively insures against leakage of flue gases.

FITZGIBBONS 400 Series STEEL BOILER

The choice of architects and builders wherever low cost heating in small homes is needed. Beautifully adapted to defense housing using radiator heat with oil, gas or stoker firing, or with coal hand firing. Built-in copper coil provides domestic hot water. All the advantages of Fitzgibbons steel boiler construction in an attractively jacketed unit priced for the field it serves.

FITZGIBBONS 65 DA—80 DA—100 DA

A distinctly small home air conditioner which has every Fitzgibbons advantage of welded steel construction, and extremely low fuel consumption. Warms, humidifies, filters and circulates the air. Quiet in operation, beautiful in appearance.



Warm air furnace, boiler, air conditioner — if it's a Fitzgibbons it is **quickly and easily installed, priced to fit its market, exceptionally low in fuel consumption.** Get the facts — mail the coupon.

AA-11

Fitzgibbons Boiler Company, Inc.

101 PARK AVENUE, NEW YORK, N. Y.

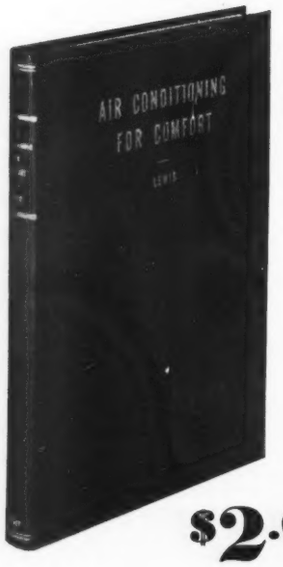
Send me details on Fitzgibbons defense housing heating unit.

80 FWA ☐ 400 SERIES ☐ 65 — 80 — 100DA ☐

Name.....

Address..... State.....

IMPROVE YOUR KNOWLEDGE OF AIR CONDITIONING



$2.00

SEND TODAY FOR
The Third Edition
of Samuel R. Lewis'

"AIR CONDITIONING FOR COMFORT"

288 Pages—6¼" x 9¼"—Illustrated—
Cloth Bound—$2.00

Here is a book that presents—in simple, readily understandable form—every kind of information necessary for an accurate and thorough knowledge of air conditioning principles, equipment, and practices. Written by S. R. Lewis, a widely-known consulting engineer who has been active in air conditioning work for more than thirty years, it deals with all angles of the air conditioning subject from the practicing engineer's viewpoint. The designing procedures explained in the book are, for example, in every detail the same procedures employed today by the author's own organization.

Featuring this third edition are several entirely new chapters on phases of the subject not previously treated, including noise control, air conditioning measurements, air conditioning standards, fire protection codes and operating suggestions. Brand new designing examples are also used, together with new forms for recording the design data, the proper filling-in of which is explained step-by-step.

The chapter devoted to Psychrometry presents nineteen different formulas for psychrometric calculations. In illustrating the correct use of these formulas, Mr. Lewis applies both the psychrometric tables and chart in order to render both devices thoroughly understandable. The chart used in this edition is less complex than the one used in his previous book.

OF VALUE BOTH AS A REFERENCE AND TEXT

Engineers in air conditioning will find the new "Air Conditioning for Comfort" invaluable as a reference book, while salesmen, students, and others may rely on it to give them a clear knowledge of fundamentals, and of the latest air conditioning methods and equipment.

Send for a copy today. We know you will consider this volume the most readable and complete book on the air conditioning science you have yet seen. You will risk nothing in ordering a copy, for you will be privileged to return it for a refund if for any reason it should prove unsatisfactory. Use the coupon at the left to order your copy now.

KEENEY PUBLISHING COMPANY
6 N. Michigan Ave. Chicago, Ill.

CONTENTS

CHAP. 1—Terms Used in Air Conditioning
CHAP. 2—Heat and Air
CHAP. 3—Air Conditioning Standards
CHAP. 4—Air Conditioning and the Human Body
CHAP. 5—The Psychrometric Table and Chart
CHAP. 6—Humidity Controllers and Control
CHAP. 7—Heat Transmission Through Barriers
CHAP. 8—Ventilation, Solar and Appliance Heat
CHAP. 9—Heating Systems
CHAP. 10—Air Conditioning Systems
CHAP. 11—Air Conditioning Apparatus
CHAP. 12—Refrigeration and Refrigerants
CHAP. 13—Refrigeration Compressors and Condensers
CHAP. 14—Refrigeration Evaporators and Auxiliaries
CHAP. 15—Record Forms for Heating and Cooling
CHAP. 16—Air Distribution
CHAP. 17—Water in Air Conditioning
CHAP. 18—Noise and Its Control
CHAP. 19—Air Conditioning Instruments and Measurements
CHAP. 20—Codes and Operating Suggestions
10" x 16" Psychrometric Chart..Inside Back Cover

KEENEY PUBLISHING COMPANY
6 N. Michigan Ave., Chicago, Ill.

Enclosed is $2.00 for a copy of the new AIR CONDITIONING FOR COMFORT. If this book should prove unsatisfactory, I will return it within 15 days for a refund.

NAME .....

STREET .....

CITY & STATE.....

HANDS ACROSS THE SEA SHAKE ON *Anaconda* QUALITY

SHEET METAL men here in North America long have agreed on the outstanding quality of Anaconda Copper—not just the durability of copper, but the uniformity which characterizes the thickness, temper and finish of Anaconda Copper. But the story continues: Anaconda Copper enjoys an equally fine reputation in many distant lands.

The following statement, quoted from a letter from a sheet metal contractor "way down under" in the Antipodes, illustrates this appreciation of Anaconda quality.

"The writer, as a tradesman, has used Anaconda Copper for the past 15 years and considers it excellent as regards consistent thickness and finish. In fact, it is the only copper that I know to be always free from buckles. We have reason to regret the restrictions . . . on Overseas and particularly American Imports."

Here at home, as well, restrictions on the use of copper are keenly felt. For as defense production forges ahead the copper industry is called upon to match an unprecedented pace. And shortage of this key metal for non-defense use is consequently unavoidable.

The American Brass Company is naturally cooperating with Uncle Sam to the limit of its ability. However, we look forward to the day when we can overcome the inconveniences which now face many of our customers. 4178

ANACONDA

Anaconda Copper & Brass

THE AMERICAN BRASS COMPANY, General Offices: Waterbury, Connecticut

Subsidiary of Anaconda Copper Mining Company

In Canada: Anaconda American Brass Ltd., New Toronto, Ont.

It's an odd time to say

"THANKS!"

To every Republic customer: "THANKS!"

And you wonder why we want to thank *YOU* —especially at a time like this and under the trying conditions all of us are experiencing.

Tons and tons of steel in record-breaking quantities are pouring from Republic furnaces and rolling from Republic mills.

Yet—you may not be able to get all the steel you want—when you want it.

And—here we are saying, "THANKS"—yes, actually thanking our friends to whom at the same time we may be forced to say, "Sorry, you can't have that much steel."

But we feel that you are entitled to our "THANKS"—

—for your understanding of the present emergency which has reduced the amount of steel available for strictly non-defense use.

—for your whole-hearted cooperation, which helps us in turn to help you.

—for your willingness to accept what steel you can get and to adjust your schedules and operations accordingly.

—for your patience, when you may have every reason to be impatient.

Republic, like all other steel producers, must —*AND WILL*—first supply the steel needed to carry on our program of National Defense. For unless we are strong defensively, some day you and we may have no business, no possessions, no home.

Yes, it's an odd time — but, too, a most opportune time — to say, "THANKS."

REPUBLIC STEEL CORPORATION

General Offices: Cleveland, Ohio

Berger Manufacturing Division
Culvert Division
Niles Steel Products Division

Steel and Tubes Division
Union Drawn Steel Division
Truscon Steel Company

REPUBLIC STEEL
DEFENSE FOR AMERICA

ALLOY and CARBON STEELS • STAINLESS STEEL • PLATES • BARS and SHAPES • STRIP • SHEETS • PIPE and TUBING
TIN PLATE • NUTS • BOLTS • RIVETS • NAILS • PIG IRON • FARM FENCE • WIRE • FABRICATED STEEL PRODUCTS

Vol. 110 American Artisan No. 11

Survey of the Sub-contracting Situation

ON September 4, President Roosevelt created within OPM the Division of Contract Distribution for the announced purpose of bringing every machine tool and every possible shop into active production on defense products.

Prior to that time, government agencies "played" with the idea, but in practice persisted in letting contracts and still more contracts to "big business." The situation came to a head when it was discovered that of more than 9 billion dollars in Army and Navy contracts awarded up to May, 1941, more than 7 billions had been awarded to 56 big corporations. Furthermore, defense production had not reached the flood desired and government began to take heed of England's suggestions (based on experience) that production would not rise until manufacture was placed on a "bits and pieces" basis.

These happenings have already been reported fully in AMERICAN ARTISAN and the general press. Most readers are also acquainted with the four major intentions (1) break down all major orders into small units spread among small firms; (2) provide assistance in relocating labor wherever priorities cause slowing down in local production; (3) expand the use of sub-contracting until every usable machine is in production; (4) provide suitable staffs of production specialists in as many local offices as possible so that every shop can quickly get advice and assistance.

Our own sheet metal contracting and fabricating industry, quite naturally, in the face of all the fan fare, would like to know (1) are our facilities needed; (2) if so, how do we get contracts.

In an effort to sift rumor from fact and to get first hand information from contractors who have secured or are working on defense production, AMERICAN ARTISAN for several months has been writing, visiting, talking to contractors all around the country.

Two important facts have been disclosed. First, up to now (mark that "up to now") there are many, many more sheet metal shops and machines and mechanics available than defense has been able to use. Second, many shops have neither the equipment, or the personnel, or the experience to handle the usual sub-contract.

This is not a criticism of our ability. In the first place, the government has strange ideas of what a small contract amounts to. Our idea of a small contract might be five to ten thousand dollars; the government's idea of a small contract is a quarter of a million dollars. Now there are few firms in our industry which can safely take or can swing a quarter million contract. If our industry is to participate in defense, still smaller contracts will have to be arranged.

As to machines and ability, we have studied at first hand a number of sub-contracts. Many specifiations are drawn to thousandths of an inch tolerance. The usual shop thinks it is working "pretty close" if it gets down to one sixty-fourth. One sixty-fourth is a long way from two thousandths. On much of the work we have examined there may not seem to be any good reason why fit should be held to thousandths of an inch—but the specs say thousandths and inspectors are too busy to argue. And we must remember that in sub-contracting we are making only one item to which other fabricators will attach additional items and they are not going to cut-and-fit for us.

Furthermore, there are few shops with the gages to check or the machines which can be set to thousandths. It is even more difficult to find rules marked in sixty-fourths. Also, most of our machines, particularly machines made several years ago, were not built to work in thousandths; time and use has not improved their tolerance; lack of attention (even oiling) has not helped matters; mechanics can't set the machines for such close work.

Our study of experiences has disclosed that even the importance of correct operations sequence is too often overlooked. For instance, one contractor making gear guards had to drill and

(*Continued on page* 100)

Amended P-22 Assigns A-10 Rating For Maintenance and Operation

HUNDREDS of thousands of the nation's industrial plants, big and small, were granted the use of an A-10 priority rating to obtain maintenance and repair materials, in line with the recently expressed policy of the Supply Priorities and Allocations Board of keeping the economy in good running order.

The rating, granted by the Priorities Division of OPM, also can be used to obtain *operating* supplies (fuel, for example) which are used up in the manufacturing process.

Retail establishments are excluded, at least for the time being, because of administrative difficulties inherent in operating a maintenance and repair plan in the field. But, generally speaking, the sweeping order extends priority assistance to many others in all segments of the American economy.

The plan is set forth in an amendment to a previous order (P-22). The amended order is published herewith.

Any plant or business qualified to use the rating can do so without making application for its use. If a manufacturer needs a repair part, for example, he simply places his repair order with a supplier and on the face of the order and all copies signs the following statement:

> "Material for Maintenance, Repair, or Operating Supplies—Rating A-10 under Preference Rating Order P-22, as amended, with the terms of which I am familiar."

This constitutes legal use of the rating. And, since the A-10 rating denotes a defense need, the order placed must be accepted by the supplier under the terms of Regulation No. 1. The supplier may extend the rating in the same manner if necessary to obtain materials going into the producer's order. Suppliers may use the rating for their own repair and maintenance needs, of course, if they are qualified to do so under the terms of the order.

The order emphasizes the fact that the rating granted cannot be used to obtain anything except maintenance, repair and operating supplies *as these are defined in the order.*

The phrasing of the certification to be placed on all purchase orders for such materials made it mandatory for those using the order to be familiar with *all its terms before using it.*

Certain stipulations are included in the order to prevent improper use:

1. Purchase orders for repair, maintenance and operating supplies must be made up separately from all other orders, if the rating is used.
2. The rating must not be used if the material can be obtained without a rating.
3. Producers using the rating may do so only to obtain materials in quantities which are not above certain 1940 levels as defined in the order; provided, however, that the Director of Priorities may permit larger quantities of materials to be ordered and used in proportion to any increase in operations over last year's levels.
4. Misuse of the plan may result in direct punitive action.
5. Utilities and mines covered by separate repair orders are not covered by the present order. However, the plan does apply to all other establishments previously covered by Preference Order P-22, which is now revised by the new plan.

Since the above is only an informal summary of the order's provisions, the full text of the order must be read and studied by all those who expect to use it.

TITLE 32—NATIONAL DEFENSE
CHAPTER IX—OFFICE OF PRODUCTION MANAGEMENT
Subchapter B—Priorities Division
Part 958—REPAIRS, MAINTENANCE AND SUPPLIES
PREFERENCE RATING ORDER P-22 AMENDED

Section 958.1, Preference Rating Order P-22, is hereby amended to read as follows:

958.1. For the purpose of facilitating the acquisition of Material for (1) the maintenance and repair of the property and equipment of producers as hereinafter defined and (2) the continued operation of the property and equipment of such producers, a preference rating is hereby assigned to deliveries of such Material upon the terms hereinafter set forth. Such terms shall control until such time as the Office of Production Management certifies specific quantities of such Material to which the preference rating herein assigned may be applied, or until the Office of Production Management may specifically limit production by any type of producer or withdraw any type of Material from use by such producer, or until the Office of Production Management may issue an order specifically relating to the maintenance, repair and operation of the property and equipment of any type of producer.

(a) Statement of Policy. It is the purpose of this Order to effectuate the policy of the Supply Priorities and Allocations Board in maintaining governmental, charitable and industrial property located in the United States, its territories and possessions, upon adequate operating basis, without expansion or improvement of facilities except where duly authorized or approved. The terms and conditions of this Order are to be interpreted in conformity with this expressed policy.

(b) Definitions.

(1) "Producer" means: (I) any governmental unit; (II) any individual, partnership, association, corporation, or other form of enterprise engaged in one or more of the following activities or acting in one or more of the following capacities to the extent that it is so engaged or so acts:

(a) manufacturing, processing, or fabricating;

(b) warehousing — maintaining warehouses for storage or distribution of any

Material;

(c) wholesaling—acting as a distributor of products sold to manufacturers, wholesalers, retailers, or other persons not consumers;

(d) charitable institutions—any charitable or eleemosynary institution which is recognized as such for purposes of the Internal Revenue Laws of the United States;

(e) carriers—urban, suburban and interurban common or contract carriers of passengers of freight by electric railway, electric coach, motor truck, or bus, including terminals of any of the foregoing; railroads, including terminals; shipping—commercial carriers of freight and passengers by ocean, lake, river, or canal, including terminals;

(f) educational institutions (including vocational training);

(g) printers and publishers;

(h) radio—commercial broadcasting and communication;

(i) telephone and telegraph communication, including wire services;

(j) hospitals, clinics and sanatoriums;

(k) petroleum—discovery, development and depletion of petroleum pools.

(2) "Material" means any commodity, equipment, accessories, parts, assemblies or products of any kind.

(3) Subject to sub-paragraph (6), "Maintenance" means the up-keep of a Producer's property and equipment in sound working condition.

(4) Subject to sub-paragraph (6), "Repair" means the restoration of a Producer's property and equipment to a sound working condition when such property or equipment has been rendered unsafe or unfit for service by wear and tear, damage, destruction of parts, or similar causes.

(5) Subject to sub-paragraph (6), "Operating Supplies" means any Material which is essential to the operation of the Producer's business and which is consumed in the course of such business, including without limitation, fuel, lubricants, catalysts, and small perishable tools, **Provided:** it shall not include any Material which is physically incorporated, in whole or in part, into any product of the Producer, or into any Material which the Producer distributes to or stores, transports or services for another person.

(6) The terms "Maintenance," "Repair," and "Operating Supplies," **do not** include Material:

(i) for the **improvement** of a Producer's property or equipment through the replacement of Material in the existing installation with Material of a better kind, quality or design;

(ii) for additions to, or expansion of, such property or equipment;

(iii) which is of a type not heretofore carried on the Producer's books under "Maintenance," "Repairs," "Operating Supplies" or the equivalent.

(7) "Supplier" means any person with whom a purchase order or contract has been placed by a Producer or another Supplier for Material.

(i) reguired by the Producer as Operating Supplies or for the Maintenance or Repair of his property or equipment, or

(ii) to be physically incorporated in other Material so required by the Producer.

(c) **Assignment of Preference Rating.** Subject to the terms of this Order Preference Rating A-10 is hereby assigned:

(1) to deliveries, to a Producer, of Material required by him as Operating Supplies or for the Maintenance or Repair of his property or equipment;

(2) to deliveries, to any Supplier, of Material

(i) required by a Producer as Operating Supplies or for the Maintenance or Repair of his property or equipment, or

(ii) to be physically incorporated in other Material so required by a Producer.

(d) **Persons Entitled to Apply Preference Rating.** The preference rating hereby assigned may be applied by

(1) a Producer;

(2) any Supplier provided deliveries to a Producer or another Supplier are to be made by him, which are of the kind specified in paragraph (c) and have been rated pursuant to this Order.

(e) **Application of Preference Rating.**

(1) A Producer or Supplier, in order to apply the preference rating to deliveries of Material to him, must endorse the following statement on the original and all copies of the purchase order or contract for such Material manually signed by a responsible official duly designated for such purpose by such Producer or Supplier;

"Material for Maintenance, Repair, or Operating Supplies—Rating A-10 under Preference Rating Order P-22, as amended, with the terms of which I am familiar."

Such endorsement shall constitute a certification to the Office of Production Management that such Material is required for the purpose stated and that the application of the rating is authorized by this Order. Any such purchase order or contract for such Material shall be restricted to Material the delivery of which is rated in accordance herewith.

(2) The Producer or Supplier placing any such rated purchase order or contract and the Supplier selling the Material covered thereby must each retain endorsed copies of such purchase orders or contracts, segregated from all other purchase orders or contracts, for a period of two years from the dates thereof for inspection by authorized representatives of the Office of Production Management.

(f) **Restrictions on Application of Rating.** The preference rating hereby assigned shall not be applied:

(1) unless the Material to be delivered cannot be secured when required without such rating;

(2) by a Producer, to obtain deliveries greater in quantity, or on dates earlier, than required for the Operation, Maintenance or Repair of such Producer's property or equipment;

(3) by a Supplier, to obtain Material for a delivery by him which has not been rated pursuant to this Order;

(4) by any Producer or Supplier to obtain scarce Material the use of which could be eliminated without serious loss of efficiency by substitution of less scarce Material or by simplification of design.

(g) **Restrictions on Deliveries, Withdrawals and Inventory.**

(1) Except as provided in paragraph (g) (5), no Producer shall, during any Calendar Quarterly Period, accept deliveries (whether or not rated pursuant to this Order) of any items of Material to be used as Operating Supplies or for Maintenance or Repair the aggregate dollar volume of which shall exceed 25% of the aggregate dollar value of the withdrawals of items of Material of the same class as carried on the Producer's books from stores or inventory during the calendar year 1940.

(2) Except as provided in paragraph (g) (5), no

(*Continued on page* 103)

Defense Developments

A-9 Rating Given Merchant Steel Products

A PLAN which will help small distributors of certain merchant steel products, including those jobbers and hardware dealers who are warehousers within the terms of Supplementary Order M-21-b, was announced September 30 by the iron and steel section of the Priorities Division.

The plan is based on a formula which will govern shipments of the merchant products listed to steel warehouses during October, November, and December. It is set forth in a directive which lists certain steel products widely sold by warehouses and stipulates the quantities of those products which may be delivered to them during the coming calendar quarter.

The order defines a warehouse as "any person who receives physical delivery of steel from a producer for sale or resale in the form received." This definition includes certain hardware stores, dealers, and jobbers who buy from producers.

In all cases covered, the rated shipments to be made in the October-December period are lower than the quantities shipped by the same producers to the same warehouses for the similar period of 1940, although total shipments to the warehouses may be as high as 110 percent of 1940 shipments if these higher deliveries do not conflict with the fulfillment of defense orders by producers. In other words, the shipments facilitated by a preference rating are lower than those received by the warehouses in 1940 but higher shipments can be made if the material is available.

The rated shipments permitted under the directive will carry ratings of A-9.

Major purpose of the plan is to provide assistance to the thousands of warehouses which perform an important service in the distribution of small quantities of steel to all kinds of customers, many of them engaged in defense work. These warehouses had been experiencing some difficulty in obtaining adequate supplies, but the new plan grants definite quotas so that these distributors may receive the products they need.

◆

Manufacturers' Excise Taxes

OFFICE of Price Administration is anxious that retailers, manufacturers, and wholesalers exert their utmost efforts to prevent pyramiding the new Federal Manufacturers' excise tax.

The following is an instance of tax pyramiding:

A manufacturer sells an article normally priced at $100 and passes on the 10 percent excise tax by raising the factory price from $100 to $110 to the wholesaler. Should the latter compute a mark-up of 10 percent, on the $110 price, instead of on the $100 base, the price to the retailer will be raised to $121 instead of $120. Then if the retailer in turn calculates a mark-up of 40 percent on cost on $121 instead of $110 he increases the retail price to $169.40. If the mark-up has been added separately the tax of $10 would have raised the retail price only from $154 to $164, but in pramiding the tax, the wholesaler and retailer inflated the $10 tax to an increase of $15.40, or an increase of over 50 percent in passing the tax on to the consumer.

The law does not prohibit a manufacturer from quoting the tax as a separate charge. When the tax is passed on, the manufacturer, at his option, may bill the amount of the tax as a separate item or include such amount in the sale price of the article.

◆

New Field Offices of CDD

FIELD offices of the Contract Distribution Division of TPM have been opened in 5 additional cities to help qualified manufacturers obtain defense work.

These offices and their addresses are as follows:

Wheeling, W. Va.—1025 Main Street, Hawley Building.

Worcester, Mass.—State Mutual Building, 340 Main Street.

Syracuse, N. Y.—Chamber of Commerce Building, 341 Warren Street.

Springfield, Ill.—307 First National Bank Building.

Dayton, Ohio.—1021 Third National Bank Building, 32 North Main Street.

◆

Ceiling Steel Products Sold by Distributors

ALL iron and steel products sold through jobbers, dealers, and distributors will be brought under a price ceiling in the near future to halt profiteering by certain members of the trade, OPA Administrator Henderson announced October 4.

The new schedule will cover sales of "seconds" and "rejects" as well as "prime" products. With its issuanc OPA will have established maximum prices for iron and steel products sold in any quantity by mills, warehouses, jobbers, distributors, dealers, agents, or brokers. Products to be included under the new ceiling will be those covered by Price Schedule No. 6, which set maximums for iron and steel sold by primary producers.

"Since the issuance of Price Schedule No. 6," said Henderson, "which froze producers' prices at first-quarter levels, the leading steel jobbers have cooperated admirably with the Office of Price Administration to keep their prices in proper relation to the mill prices set by the schedule. In recent months, however, certain members of the trade have demanded exorbitant prices from manufacturers in urgent need. Numerous complaints have reached my office, citing cases where consumers in need of steel have been compelled to pay prices ranging from 50 percent to 200 percent above those generally quoted. In many instances, 'seconds' and 'rejects'—steel containing imperfections—have been sold at prices considerably higher than those charged for steel of first grade. This is profiteering, pure and simple, and must be stopped."

Ours Is an Industry of Systems—Not Products

IN SETTING up the Defense Industry Advisory Committee for the Piping, Plumbing and Heating industries, Harry G. Starr, Chairman of Defense Emergency Committee and the committee has tried to impress in the minds of officials that this industry is an installer of "systems" and not an installer of "finished products." His explanation is contained in a report which says—

"It was early apparent that the Government cannot deal officially and effectively with all of the large number of separate and distinct units making all of the products used in our industry. While each separate manufacturing group uses widely different processes and materials, nevertheless the use of the *product* of each separate group is necessary for the completion of *systems* of Piping, Plumbing and Heating and since so much of the Priorities system now in effect is based on the necessity of the finished product or commodity, then it becomes essential that the industry be recognized on the finished product basis.

"It is growing increasingly apparent that recognition of necessity under the Priorities System will be based on the necessity of the finished unit to Defense or Civilian requirements and from this standpoint it is clear that the Defense or Civilian requirements is not for Furnaces, or Boilers or Valves or Plumbing Fixtures, but for *Systems* of Piping, Plumbing and Heating.

"Therefore, we have an industry which should not be broken down into its component parts, each one seeking in a competitive fashion to acquire a supply of raw materials to be used in the manufacture of a commodity which has no purpose except when used with the product of other manufacturers.

"It has long been apparent that the evolving Priorities System is tending toward the allocation of raw materials. This is proven by the growing number of Orders in which *allocation* is increasingly important and is also proven by numerous speeches of officials in the Office of Production Management in which an increasing reference is being made to allocation.

"We believe that if and when allocation is applied to all except implements of War, that the determining factor in securing ample supplies of raw material will be the degree of necessity of the finished product for use for Defense or Civilian requirements and it has been our contention that, in our case, the finished article is a *system* of Piping, Plumbing and Heating.

"For all of the reasons stated above our intention and our persistent efforts in Washington have been to establish in the minds of the officials of the Office of Production Management the following facts:

"1. Our Industry has a completely essential character. Without the use of our product the Industrial Program would fail and the health of the Nation would be seriously affected.

"2. That we are a complete industry with tremendous volume and unusually complex in its nature.

"3. That it is essentially a service industry requiring distribution through local Wholesale Stocks.

"4. That it cannot successfully operate under a Priorities System which requires that the certificates be issued in advance of production. That on the contrary, the product must be manufactured and distributed and made available for use in the construction of *systems* of Piping, Plumbing and Heating in advance of the known purpose or specific priority to which it will ultimately be applied.

"All of this has been for the purpose of acquainting you with the theory which we have been following in our attempt to secure an Advisory Committee, being confident that the creation of such a Committee would result in sustaining the entire industry in its position as an essential factor during the Defense Emergency."

◆

Individual Farmers Don't Need Ratings for Ordinary Equipment

THE Department of Agriculture has pointed out that individual farmers are not required to have priority ratings of any kind under the defense program in order to purchase ordinary farm machinery, equipment, repair parts, fertilizers, insecticides, nails, fencing, *roofing*, or similar items.

"Priority ratings on equipment and supplies such as these," M. Clifford Townsend, director, Office of Agricultural Defense Relations, explained, "are issued by the Office of Production Management to manufacturers, processors and warehousemen in order to avoid having individuals obtain ratings.

"On special classes of machinery which are used for purposes other than farming, such as heavy duty electric motors, a preference rating will be necessary. This can be applied for on what is known as a PD-1 form obtainable from the Office of Production Management."

◆

Allocation Needs an Over-All Plan

Allocations of scarce materials to small industry *as a class* pending an over-all program has been found impossible, Albert J. Browning, special assistant to the executive director of the Supply Priorities and Allocations Board, told a joint meeting of the National Hardware Manufacturers' Association, the National Hardware Jobbers' Association and the National Ass'n of Sheet Metal Distributors. The solution is to determine how much of a critical material will be set aside for civilian use, and then to divide the quantity among industries and individuals within the industries.

It seems to me, he said, to be clear that if you are looking for a total solution you have got to come to an allocation program whereby some proportion of critical materials is set aside for general civilian use.

That of course implies recognition of the fact that, regardless of defense needs, there are certain minimum quantities of these scarce materials which our civilian economy *must* have. And when we have recognized that fact, it becomes obvious that the place to start is at the bottom with the raw materials themselves.

The problem then becomes a double one: First, how much of any critical material are you going to set aside for civilian use, and, second, of the quantity that you have so set aside, which industry and which individuals within the industry get how much? In other words, there is first the problem of allocation and then the problem of distribution.

That means a specific restriction in the operations of each industry to a minimum economic level. It means the same thing *within* the industry: a specific restriction on the operations of each individual company.

That is a harsh method, but it is not new. It is the method which was finally arrived at—in Germany, in

England, and in the United States—during the last war.

Although the details of such an over-all program have not yet been agreed upon, the general thinking in Washington now is that from careful studies of materials used by each industry, a total figure, for each scarce material, can be developed. When such a figure is settled upon, it will then remain to add to it the total military requirements for that particular material. When the sum thus reached—civilian demand plus military demand—is larger than the total available supply, as it will be in the case of all of these critical metals, the obvious next step will be to cut down the amount available for civilian industry.

I believe that it is clear, however, that *if* you are going to restrict the amounts of a raw material which the different industries may have, it is necessary to curtail operations at the finished goods end.

◆

Green Light For Remodeling

COPIES of forms and procedures which will clear the way for the extension of credit for the repair and remodeling of homes in defense areas have been distributed to all Federal Reserve Banks and Branches by the Division of Defense Housing Coordination.

The forms and procedures will implement exceptions to Federal Reserve consumer credit regulations as contained in Section 6 (e) (2). This provides that the limitations on installment credit, even when not excepted under other provisions, shall not apply when the proceeds are to be used to finance the remodeling or rehabilitation of any dwelling which the Defense Housing Coordinator shall designate as being for "defense housing" as defined by the Coordinator.

In announcing the procedures making this section operative, Charles F. Palmer, Coordinator of Defense Housing, pointed out that no application for an exception under the credit regulations will be granted unless it involve the remodeling or rehabilitation of a dwelling:

(a) located in an area where an acute housing shortage exists or impends by reason of national defense activity (Defense Housing Area);

(b) suitable in location, rent, or price, for persons engaged in national defense activities in the area;

(c) reasonable preference in occupancy in which will be given to defense workers;

(d) the number of habitable dwelling units in which will be increased thereby.

Any person proposing remodeling or rehabilitation conforming to the above requirements can, if unable to undertake such work without an exception, make application to the Coordinator by completing a form entitled "Application for Designation of Remodeling or Rehabilitation as Defense Housing for Exception under Regulation W."

In order that the Coordinator may determine whether or not the applicant for credit will require priorities aid to secure materials with the proceeds of his loan, there has also been provided a separate form entitled "Information Regarding Material and Equipment Entering into Defense Housing Remodeling and Rehabilitation." This form should be completed and submitted along with the application for designation unless the applicant is certain no priorities aid is necessary, in which case the application or designation should so indicate.

◆

Heating-S.M. Get Their Share

WITH its staff technicians ready to take over the job of advising home owners how to convert vacant space into housing units for defense workers, the Home Owners' Loan Corporation has released a report on its eight-year reconditioning experiences and an analysis of its "reconditioning dollar."

The breakdown of the reconditioning dollar follows:

	Per cent to each trade ($166,000,000)	Labor	Materials
Masonry	4.2%	60%	40%
Carpentry and millwork	19.2	55	45
Roofing and sheet metal	14.8	40	60
Plastering and stucco	3.4	65	35
Exterior painting	20.6	65	35
Heating, plumbing, electrical work	12.4	45	55
Interior painting (wall and trim)	10.7	65	35
Papering	5.5	60	40
Refinishing floors	3.3	65	35
Stoves and ranges	.4	10	90
Landscaping, walks, drives	.4	45	55
Miscellaneous: (Linoleum, shades, hardware, cleaning)	5.1	55	45
Totals	100%	55%	45%

Homes Registration Offices under the Defense Housing Coordinator are listing all properties with vacant space which can be converted into rooms and apartments for defense workers crowded in defense areas. The HOLC will furnish technicians to advise those who are willing to repair and modernize their homes for that purpose, giving cost estimates without charge.

If the jobs are large enough to require technical planning and supervision, the HOLC will recommend an architect or technician, if desired, who will do the work for a reasonable fee. The Homes Registration Offices, on the other hand, will give home owners counsel as to methods of financing.

◆

$9,669,867,000 For Defense

BY SEPTEMBER 1 the value of defense construction—completed, in progress and scheduled—amounted to $9,669,867,000, the OPM Bureau of Research and Statistics reported last week.

Construction valued at $3,444,713,000 was in place. This included completed and semicompleted projects, and represented 36 percent of the defense construction program to date, 64 percent of scheduled construction remaining to be completed or undertaken.

The military program involved construction valued at $4,315,169,000, of which $1,713,409,000, or 40 percent, was in place on September 1.

The nonmilitary defense construction program came to $5,354,698,000 of which $1,731,304,000 or 32 percent, was in place.

Priorities —

Address (excerpted) by Donald M. Nelson, Executive Director, Supply Priorities and Allocations Board, before a luncheon meeting of the New York Sales Executives Club, New York, October 14, 1941.

FIRST of all I want to talk about what the priorities system is *not*.

A Congressman called my office the other day to complain: "Mr. Nelson, your priorities system is raising hell with business in my district. It's got business all crippled."

To which I replied: "Mr. Congressman, it isn't priorities that is bothering business in your district. It's shortages. There's a big difference."

It is that big difference that I would like to discuss first of all: that distinction between the shortage which causes the trouble and the priorities system which tries to alleviate the trouble.

These shortages are the key to nearly all of the dislocations which our economy is feeling as a result of this defense effort. Where do they come from?

In general terms, the answer is simple: They come from the tremendous effort we are making—from the fact that modern war takes everything you can possibly give it, from the hard, inescapable fact that this nation cannot possibly lay its hands on enough of the critical metals to meet all the needs of defense and at the same time meet all the wants of the civilian economy.

Everybody Wants Everything

Before we look into the military needs in detail, let's take just a moment to consider the wants of our civilian economy. The tremendous sums which are being spent for defense are of course being translated into mass purchasing power. Right at the moment, our national spending power—that is the spending power of our 130 millions of people who are seeking to buy the things they as individuals need or desire—is undoubtedly greater than it has ever been before. That means that the demand for everything we make has gone up.

All by itself that demand could furnish us with a vast business boom. People who have been on short rations for years have money to spend now; an enormous backlog of unsatisfied wants has been built up and is now looking for satisfaction. The country is looking for the luxuries and the little extras that it has been doing without.

If those wants could be filled without interfering with the defense effort everything would be rosy. Unfortunately they can't. The barrel only holds so much. We cannot under any circumstances find the materials to make all the things we need for defense, all the things that our civilian economy must have if it is to function properly, *and* all of the luxury and comfort items that people today want to buy. There just isn't that much in the barrel. We have to cut somewhere. The only place to do the cutting is in the area of things that we can get along without if we have to.

Modern war is a war of materials and of productive systems. That cannot be said too often. The day when you could be secure if you raised a mass army, put rifles in the army's hands, and taught it how to march and shoot, are gone forever. Today's army cannot be any better than its equipment—plus the ability of the people back home to replace that equipment in adequate volume. And today's equipment is fearfully complex. It calls for such metals as aluminum in incalculably greater quantity than normal peace-time use. It eats up that basic metal, steel, with an insatiable appetite. It uses copper in such volume that this country, which has always had abundant supplies of that metal, cannot in the current month make its total production plus its total imports equal the total of Army and Navy orders.

Civilian Copper Just Can't Be

It might be a good thing to examine that copper picture more closely for a moment.

During 1942, our military requirements for copper will run to at least one million tons. I use that word "requirements" advisedly; I mean by that that our Army and Navy *must* have that much copper for articles that we *must* have for defense. In addition, it will take at least 550,000 tons of copper for the maintenance and necessary expansion of those power, transportation, communication and other services which simply have to be maintained if our economy is not to collapse utterly. Thus during the coming year we start with the knowledge that slightly more than one and one-half million tons of copper are absolutely needed for direct defense purposes and for civilian uses which cannot possibly be pared down.

Now the total supply of copper that is going to be available during 1942 is, by the maximum estimate, 1,800,000 tons. That includes all of the copper we can produce in the United States, plus all that we shall be able to import, plus all that we can reclaim through the remelting of scrap copper. As a matter of fact it is probable that we won't actually get the 1,800,000 tons; mining is subject to various hazards and shipping shortages and submarine warfare might easily reduce the amount which we expect to import. Nevertheless, let's take the rosiest view possible and assume that we shall have 1,800,000 tons of copper in our national basket for 1942.

We have already seen that right off the bat we must reach into that basket and take out one and one-half million tons. We have left, therefore, slightly less than 300,000 tons of copper for ordinary civilian uses.

Yet those "ordinary civilian uses"—by which I mean *all* normal uses of copper except those involved in maintaining our transportation, communication and defense manufacturing industries at the necessary level—would run to more than one million tons, if

England, and in the United States—during the last war.

Although the details of such an over-all program have not yet been agreed upon, the general thinking in Washington now is that from careful studies of materials used by each industry, a total figure, for each scarce material, can be developed. When such a figure is settled upon, it will then remain to add to it the total military requirements for that particular material. When the sum thus reached—civilian demand plus military demand—is larger than the total available supply, as it will be in the case of all of these critical metals, the obvious next step will be to cut down the amount available for civilian industry.

I believe that it is clear, however, that *if* you are going to restrict the amounts of a raw material which the different industries may have, it is necessary to curtail operations at the finished goods end.

◆

Green Light For Remodeling

COPIES of forms and procedures which will clear the way for the extension of credit for the repair and remodeling of homes in defense areas have been distributed to all Federal Reserve Banks and Branches by the Division of Defense Housing Coordination.

The forms and procedures will implement exceptions to Federal Reserve consumer credit regulations as contained in Section 6 (e) (2). This provides that the limitations on installment credit, even when not excepted under other provisions, shall not apply when the proceeds are to be used to finance the remodeling or rehabilitation of any dwelling which the Defense Housing Coordinator shall designate as being for "defense housing" as defined by the Coordinator.

In announcing the procedures making this section operative, Charles F. Palmer, Coordinator of Defense Housing, pointed out that no application for an exception under the credit regulations will be granted unless it involve the remodeling or rehabilitation of a dwelling:

(a) located in an area where an acute housing shortage exists or impends by reason of national defense activity (Defense Housing Area);

(b) suitable in location, rent, or price, for persons engaged in national defense activities in the area;

(c) reasonable preference in occupancy in which will be given to defense workers;

(d) the number of habitable dwelling units in which will be increased thereby.

Any person proposing remodeling or rehabilitation conforming to the above requirements can, if unable to undertake such work without an exception, make application to the Coordinator by completing a form entitled "Application for Designation of Remodeling or Rehabilitation as Defense Housing for Exception under Regulation W."

In order that the Coordinator may determine whether or not the applicant for credit will require priorities aid to secure materials with the proceeds of his loan, there has also been provided a separate form entitled "Information Regarding Material and Equipment Entering into Defense Housing Remodeling and Rehabilitation." This form should be completed and submitted along with the application for designation unless the applicant is certain no priorities aid is necessary, in which case the application or designation should so indicate.

◆

Heating-S.M. Get Their Share

WITH its staff technicians ready to take over the job of advising home owners how to convert vacant space into housing units for defense workers, the Home Owners' Loan Corporation has released a report on its eight-year reconditioning experiences and an analysis of its "reconditioning dollar."

The breakdown of the reconditioning dollar follows:

	Per cent to each trade ($166,000,000)	Labor	Materials
Masonry	4.2%	60%	40%
Carpentry and millwork	19.2	55	45
Roofing and sheet metal	14.8	40	60
Plastering and stucco	3.4	65	35
Exterior painting	20.6	65	35
Heating, plumbing, electrical work	12.4	45	55
Interior painting (wall and trim)	10.7	65	35
Papering	5.5	60	40
Refinishing floors	3.3	65	35
Stoves and ranges	.4	10	90
Landscaping, walks, drives	.4	45	55
Miscellaneous: (Linoleum, shades, hardware, cleaning)	5.1	55	45
Totals	100%	55%	45%

Homes Registration Offices under the Defense Housing Coordinator are listing all properties with vacant space which can be converted into rooms and apartments for defense workers crowded in defense areas. The HOLC will furnish technicians to advise those who are willing to repair and modernize their homes for that purpose, giving cost estimates without charge.

If the jobs are large enough to require technical planning and supervision, the HOLC will recommend an architect or technician, if desired, who will do the work for a reasonable fee. The Homes Registration Offices, on the other hand, will give home owners counsel as to methods of financing.

◆

$9,669,867,000 For Defense

BY SEPTEMBER 1 the value of defense construction—completed, in progress and scheduled—amounted to $9,669,867,000, the OPM Bureau of Research and Statistics reported last week.

Construction valued at $3,444,713,000 was in place. This included completed and semicompleted projects, and represented 36 percent of the defense construction program to date, 64 percent of scheduled construction remaining to be completed or undertaken.

The military program involved construction valued at $4,315,169,000, of which $1.713.409,000, or 40 percent, was in place on September 1.

The nonmilitary defense construction program came to $5,354,698,000 of which $1,731,304,000 or 32 percent, was in place.

Priorities —

Address (excerpted) by Donald M. Nelson, Executive Director, Supply Priorities and Allocations Board, before a luncheon meeting of the New York Sales Executives Club, New York, October 14, 1941.

FIRST of all I want to talk about what the priorities system is *not.*

A Congressman called my office the other day to complain: "Mr. Nelson, your priorities system is raising hell with business in my district. It's got business all crippled."

To which I replied: "Mr. Congressman, it isn't priorities that is bothering business in your district. It's shortages. There's a big difference."

It is that big difference that I would like to discuss first of all: that distinction between the shortage which causes the trouble and the priorities system which tries to alleviate the trouble.

These shortages are the key to nearly all of the dislocations which our economy is feeling as a result of this defense effort. Where do they come from?

In general terms, the answer is simple: They come from the tremendous effort we are making—from the fact that modern war takes everything you can possibly give it, from the hard, inescapable fact that this nation cannot possibly lay its hands on enough of the critical metals to meet all the needs of defense and at the same time meet all the wants of the civilian economy.

Everybody Wants Everything

Before we look into the military needs in detail, let's take just a moment to consider the wants of our civilian economy. The tremendous sums which are being spent for defense are of course being translated into mass purchasing power. Right at the moment, our national spending power—that is the spending power of our 130 millions of people who are seeking to buy the things they as individuals need or desire—is undoubtedly greater than it has ever been before. That means that the demand for everything we make has gone up.

All by itself that demand could furnish us with a vast business boom. People who have been on short rations for years have money to spend now; an enormous backlog of unsatisfied wants has been built up and is now looking for satisfaction. The country is looking for the luxuries and the little extras that it has been doing without.

If those wants could be filled without interfering with the defense effort everything would be rosy. Unfortunately they can't. The barrel only holds so much. We cannot under any circumstances find the materials to make all the things we need for defense, all the things that our civilian economy must have if it is to function properly, *and* all of the luxury and comfort items that people today want to buy. There just isn't that much in the barrel. We have to cut somewhere. The only place to do the cutting is in the area of things that we can get along without if we have to.

Modern war is a war of materials and of productive systems. That cannot be said too often. The day when you could be secure if you raised a mass army, put rifles in the army's hands, and taught it how to march and shoot, are gone forever. Today's army cannot be any better than its equipment—plus the ability of the people back home to replace that equipment in adequate volume. And today's equipment is fearfully complex. It calls for such metals as aluminum in incalculably greater quantity than normal peace-time use. It eats up that basic metal, steel, with an insatiable appetite. It uses copper in such volume that this country, which has always had abundant supplies of that metal, cannot in the current month make its total production plus its total imports equal the total of Army and Navy orders.

Civilian Copper Just Can't Be

It might be a good thing to examine that copper picture more closely for a moment.

During 1942, our military requirements for copper will run to at least one million tons. I use that word "requirements" advisedly; I mean by that that our Army and Navy *must* have that much copper for articles that we *must* have for defense. In addition, it will take at least 550,000 tons of copper for the maintenance and necessary expansion of those power, transportation, communication and other services which simply have to be maintained if our economy is not to collapse utterly. Thus during the coming year we start with the knowledge that slightly more than one and one-half million tons of copper are absolutely needed for direct defense purposes and for civilian uses which cannot possibly be pared down.

Now the total supply of copper that is going to be available during 1942 is, by the maximum estimate, 1,800,000 tons. That includes all of the copper we can produce in the United States, plus all that we shall be able to import, plus all that we can reclaim through the remelting of scrap copper. As a matter of fact it is probable that we won't actually get the 1,800,000 tons; mining is subject to various hazards and shipping shortages and submarine warfare might easily reduce the amount which we expect to import. Nevertheless, let's take the rosiest view possible and assume that we shall have 1,800,000 tons of copper in our national basket for 1942.

We have already seen that right off the bat we must reach into that basket and take out one and one-half million tons. We have left, therefore, slightly less than 300,000 tons of copper for ordinary civilian uses.

Yet those "ordinary civilian uses"—by which I mean *all* normal uses of copper except those involved in maintaining our transportation, communication and defense manufacturing industries at the necessary level—would run to more than one million tons, if

everybody got what he needed. And to meet that million-ton demand, our basket holds rather less than 300,000 tons.

I want to emphasize again that those figures, bad as they are, represent the most optimistic view possible. We can't possibly increase our supply above that level of 1,800,000 tons, and we may very well fall substantially short of that mark. And the figure for military requirements is a minimum figure which cannot be lowered but may easily be raised. It does not, for example, make any allowance for the copper we should need if we got into a shooting war; it does not allow for any possible expansion of our Army. I might point out in that connection that an Army of four million men would need brass—not for actual combat, but simply for maintenance at the theater of operations—in an amount which would require more than a million and a quarter tons of copper annually.

The situation in regard to copper, then, is probably worse than the figures show rather than better. But even assuming that it is not, it is perfectly obvious that for all ordinary civilian uses of copper the demand exceeds the supply by more than three to one. We are very clearly in a spot where we cannot afford to use one pound of copper if we can possibly get along without it. More than two-thirds of all ordinary demands for copper are going to be disappointed no matter what we do.

"Business as Usual" Hasn't a Chance

When you have a situation as acute as that, the very worst thing you could do would be to do nothing at all. If we had no priority controls—if the Government did not step in to say that the essential demand for copper should have precedence over the non-essential demand—no user of copper would be in the slightest degree better off than he is now. On the contrary, he would be much worse off. He would still face that better than three-to-one demand for every pound of copper on the market, and there would be no order or sanity whatever to the way in which that demand was met.

It ought to be clear, then, that you cannot possibly have business as usual in face of that kind of a shortage. You have to have controls, you have to have rationing, you have to have planned, forceful Government action which will say, in effect: "There is not nearly enough copper to go around, and we are living in a time of great emergency; consequently, the Government must see to it that no copper is used by anyone unless the job that person is doing is one which is essential in one way or another to the country's welfare."

That is precisely what the Government is doing now. For the rest of the emergency no one will be allowed to make such things as vases, pitchers, candlesticks, andirons, cuspidors, ashtrays and doorknobs containing copper. You will not, after the first of the year, be able to buy copper stripping or screening for your house; if you die you can't be buried in a bronze casket, and your family will not be able to put up a bronze memorial marker in your memory.

Steel Situation Is a Tough Nut

Turn next to steel. We have the greatest steel-producing capacity of any country on earth. Our mines, blast furnaces, our fabricating plants—they are adequate to produce steel to meet any conceivable need . . . or so, at any rate, we had always supposed.

But are they, really? Look at the figures. Steel ingot productive capacity today for the nation as a whole is 86,000,000 tons. Construction of new facilities now under way will raise that capacity to 89,000,000 tons by the end of 1942.

During 1942, the best estimates we can get show that for defense—for our Army and Navy, plus the things we must send abroad under the Lend-Lease Act—we must have more than 35 million tons. Thirty-five from 89 equals 54: offhand, one might think that would be ample to carry us through the year. Yet our civilian economy would, if there were no restrictions at all, consume 86 million tons of steel during the year. It can't possibly get what it wants, because we have to subtract 35 million tons from the total of 89 million tons which will be produced; but when what appear to be all of the less essential requirements have been thrown out, we still find our civilian economy needing 58 and one-half million tons during the year. And that, added to the 35-odd million tons needed for defense, brings our total national need—our *need*, not what we would use if there were no restrictions—up to nearly 94 million tons, which is about five million tons more than there is going to be.

You can't work out arithmetic problems like that and not get a shortage. To sum it up: in steel you get a five million ton shortage even when you have pared your civilian requirements down to what looks like the essentials.

(*Editor's Note: There is, of course, a difference of opinion. For example, Walter Tower, president of the American Iron & Steel Institute, recently stated the nation's rated steel making capacity is more than 87 million tons of ingots a year. Production can be increased to 89 million tons a year. During 1941 our defense program and British-Canadian tonnage requirements called for ingot production of 18 million tons a year. 1942 requests will be larger. But, according to Mr. Tower (this was before our pledges to Russia) there should be fully 67 million tons available in 1941 and 1942 for domestic, civilian use. The country never has consumed 64 million tons of steel in a year. Said Mr. Tower in September—"My opinion is that the situation has seen its worst and from now on there will be some measure of improvement. Under the functioning of the general order, steel buying should be more orderly and the net result should be more steel to go around."*

The Daily Metal Trade recently said: "As the present confusion is cleared away and steel is allocated more systematically and intelligently, it will be found that more steel is available for civilian use than now is anticipated by Washington. Production will catch up with demand sooner than we think."

The magazine Steel has stated: "Such shortages as have appeared in steel are due more to the misapplication of recent production than to any serious deficiency. Too many government agencies bought too far ahead and too many people have acquired top-heavy inventories. Intelligent allocation of steel can remedy this situation in a short time.")

It's Not Priorities — It's Shortages

Now it must be obvious that what is troubling industry in regard to steel and in regard to copper isn't priorities at all. It's shortages. No industrialist is going without copper or steel *because* they are under priority control; the exact opposite is true—they are under priority control because he has to go without them. Priority control is the one thing that keeps

(*Continued on page* 90)

Sub-contract Trains To Display Items Wanted

TO MAKE sure that no qualified manufacturer —no matter where he is—misses an opportunity to get a defense contract for lack of information, officers of the Army, Navy, Maritime Commission, and the OPM will tour the country beginning November 10 in three special exhibit trains.

The specials will carry exhibits consisting of samples of defense equipment and parts needed by the services to give prospective defense manufacturers a clear idea as to the type of articles needed. They will be supplemented by blueprints and specifications.

The specials will leave Washington simultaneously on Monday, November 10 and be on the road a little more than a month. One will travel the eastern seaboard, the second will swing through the middlewest, and the third will go to the west coast and return via the south.

Officials aboard the trains will endeavor to determine what type of defense equipment manufacturers are capable of producing and guide those with suitable equipment either to defense contractors who have work to let under subcontracts or to the proper government procurement offices. In some instances the train staffs will initiate negotiations which, carried through at regular field offices of the services, will result in contracts.

Manufacturers may obtain admission to the trains by writing to the nearest field offices of the OPM Contract Division and, if they have not already done so, supplying detailed information regarding machine tools and other equipment of their factories. (List of Contract Distribution Division offices published in October issue.)

Services represented on the trains will include the Army Air Corps, Ordnance Department, Quartermaster Corps, Signal Corps, Corps of Engineers, Chemical Warfare and Medical Corps, various branches of the Navy, and the Maritime Commission.

Each train will have aboard 16 Army officers, nine Navy officers and representatives of the Maritime Commission, and eight representatives of the OPM. This personnel will be augmented by local representatives of the services and the OPM in the districts through which the trains pass. Thus the staff will always include officers familiar with local problems.

Each train will consist of six cars equipped with defense "samples" and conference tables, and two cars providing living quarters.

An advance engineer for each train will leave Washington this week to visit field offices of the Contract Distribution Division and of the services along the route and prepare for each stop.

Definite hours will be assigned to the visiting manufacturers so that congestion will be avoided as far as possible. Visitors must bring with them information regarding their facilities. They will first enter an OPM conference car, where each one's situation will be analyzed and directions given to the service car offering him the greatest opportunity.

Both on the specials and at the defense production clinics arranged by the Contract Distribution Division, the main objective is to help manufacturers determine whether they can do defense work and, if so, to put them in touch with such work. This will be helpful not only to those whose plants are suited to defense production but to those whose factories are not. Many factory owners are now in doubt on this vital question and, accordingly, are unable to plan their future operations either way.

Following are the schedules of the three special trains:

EASTERN TRAIN—NUMBER 1

November

10	Monday	
11	Tuesday	Wilmington, Delaware
12	Wednesday	Trenton, New Jersey
13	Thursday	Bridgeport, Connecticut
14	Friday	Bridgeport, Connecticut
15	Saturday	Providence Rhode Island
17	Monday	Lynn, Massachusetts
18	Tuesday	Portland, Maine
19	Wednesday	Bangor, Maine
20	Thursday	Berlin, New Hampshire
21	Friday	Rutland, Vermont
22	Saturday	Worcester, Massachusetts
24	Monday	Worcester, Massachusetts
25	Tuesday	Springfield, Massachusetts
26	Wednesday	Springfield, Massachusetts
28	Friday	Waterbury, Connecticut
29	Saturday	Poughkeepsie, New York

December

1	Monday	Albany, New York
2	Tuesday	Utica, New York
3	Wednesday	Syracuse, New York
4	Thursday	Binghamton, New York
5	Friday	Scranton, Pennsylvania
6	Saturday	Reading, Pennsylvania
8	Monday	Harrisburg, Pennsylvania
9	Tuesday	Greensboro, North Carolina
10	Wednesday	Charlotte, North Carolina
11	Thursday	Greenville, South Carolina
12	Friday	Atlanta, Georgia
13	Saturday	Macon, Georgia
15	Monday	Tampa, Florida
16	Tuesday	Jacksonville, Florida
17	Wednesday	Columbia, South Carolina
18	Thursday	Raleigh, North Carolina
19	Friday	Richmond, Virginia

MIDWESTERN TRAIN—NUMBER 2

November

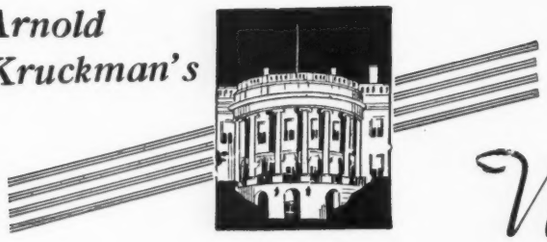
10	Monday	
11	Tuesday	Pittsburgh, Pennsylvania
12	Wednesday	Pittsburgh, Pennsylvania
13	Thursday	Buffalo, New York
14	Friday	Buffalo, New York
15	Saturday	Erie, Pennsylvania
17	Monday	Akron, Ohio
18	Tuesday	Akron, Ohio
19	Wednesday	Youngstown, Ohio
21	Friday	Toledo, Ohio
22	Saturday	Lansing, Michigan
24	Monday	Muskegon, Michigan
25	Tuesday	South Bend, Indiana
26	Wednesday	Milwaukee, Wisconsin
27	Thursday	Milwaukee, Wisconsin
28	Friday	Madison, Wisconsin
29	Saturday	Minneapolis, Minnesota

December

1	Monday	Minneapolis, Minnesota
2	Tuesday	Rock Island, Illinois
3	Wednesday	Rock Island, Illinois
4	Thursday	Des Moines, Iowa
5	Friday	Omaha, Nebraska
6	Saturday	Springfield, Missouri
8	Monday	Springfield, Illinois
9	Tuesday	Joliet, Illinois

(*Continued on page* 108)

Arnold Kruckman's



Washington Letter

Government Buying for Defense Housing

SEVENTEEN items are used so universally in the equipment of defense housing that the Federal Works Agency is organizing a unit to buy these supplies by Mass Purchasing. The new unit is headed by D. E. A. Cameron recently from Toledo, where he did similar work connected with housing for the city of Toledo. Mr. Cameron's unit is tentatively known as the Mass Purchasing Committee, and at this writing it is chiefly engaged in boiling details down to a workable system of initiating the mass or group buying.

When the plan is in operation the Mass Purchasing Committee will buy for the Public Buildings Administration, the United States Housing Authority, the Federal Works Division of Defense Housing, the Mutual Ownership Defense Housing Division, the Public Works Administration, the Works Projects Administration, all of which are subordinate parts of the Federal Works Agency. It also will buy for the Farm Security Administration, the Tennessee Valley Authority, the Alley Dwelling Authority of the District of Columbia, and to an undefined extent for the Army and the Navy. Naturally, its buying program will directly influence the Rural Electrification Administration, the Federal Housing Administration, the Defense Housing Corporation, the Electric Home and Farm Authority, the Federal Home Loan Bank Board, and the agencies in the Department of Agriculture and Department of Interior which sponsor housing projects.

It is estimated the Mass Purchasing Committee will buy approximately 80% to 90% of all equipment purchased for defense housing by the Federal Government. Apparently it will either directly handle or influence the other 20% to 10%. The seventeen items include the equipment that goes into the bathroom, the kitchen, and that heats the dwelling.

Prices Allotted for Heating

Forced warm-air heating equipment is probably among the foremost of the items. Roughly, the program allocates one-fifth to one-fourth of the funds set aside for equipment to acquisition of heating units. The average defense dwelling unit costs $3,500, and the average over-all allocation set aside for the seventeen items is estimated at $250. Heating equipment, therefore, is programmed to cost somewhere between $50 and $65 per dwelling unit, not installed. In the homes that cost as much as $6,000 each, the outside limit set up under the OPM priority regulations, there is from $85 to $125 to spend on heating equipment.

Specifications for heating equipment used in defense housing were promulgated four or five months ago by the Procurement Division of the Treasury. They were set up with the cooperation of the Federal Works Agency housing officials. These specifications in the main still govern the buying program for defense housing. The Procurement Division, until recently, bought 50% of all equipment that has gone into the defense housing thus far built.

Types of Furnaces Bought

The fact that even officials are unable to determine exactly the limits of mass buying as practised hitherto by Procurement Division is a fair index of the uncertainties that envelope the whole buying procedure. It is not even possible to secure a firm estimate of the number of furnaces purchased by Procurement. The most reliable source reports that during the past six months Procurement purchased for defense housing 6,890 furnaces; of this number 5,466 are coal-fired furnaces (cast and steel) and 1,424 gas furnaces.

Another equally reliable and responsible source states that within the past 40 days Procurement has contracted for 15,000 defense housing furnaces. It was led to this large purchase for the same reason that people elsewhere stocked up on many things made of metal, it was beating Priorities to the draw. It should be some mild satisfaction to realize that even Government agencies have been so uncertain about it all that they bought great quantities of goods to hoard against the day of scarcity.

The discrepancy in the two quoted figures of purchases probably is explained thus: the 6,890 furnaces reported by the Federal Works Agency in all likelihood are the furnaces supplied by the Public Buildings Administration for the defense housing built directly under its own responsibility, while the 15,000 furnaces include reserves the Federal Works Agency has laid up for its own immediate Public Buildings Administration program and for the defense housing it is building for other units in its own group.

Procurement To Go Under President

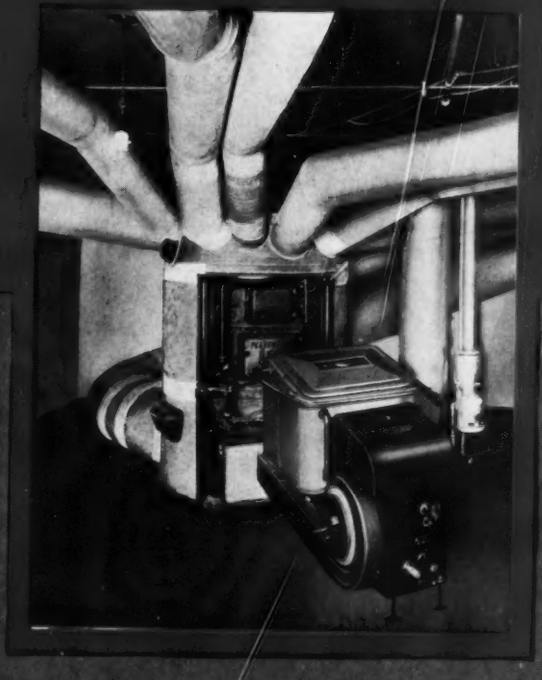
The situation is not the fault of any person or any agency. It is the result of the old system of the permanent Government mixed with the confusion introduced by the shifts and changes in the Defense Government. The military services will not give out any accurate over-all figures about their purchases; Procurement is hedged by all kinds of legal restrictions in giving out such information; and some of the other agencies supply the information only so far as it pertains to their own operations. Situations like this probably explain why the President plans to take the Procurement Division over into the Executive Offices where

(*Continued on page* 94)

AMERICAN ARTISAN

RESIDENTIAL AIR CONDITIONING

SECTION



DEVOTED TO HOME AND SMALL COMMERCIAL AIR CONDITIONING

ELECTRO-MATIC and
AMERICAN AUTOMATIC
filter assembly lines

AMERICAN AIR FILTERS FOR NATIONAL DEFENSE

Roto-Clone Grinding Bench with Airmat PL after-cleaner for finishing Airplane propellers.

ASSEMBLY lines such as those shown above, crowded with Automatic and Electro-Matic filter sections for new industrial buildings, give some idea of the important part that air cleaning and dust control play in National Defense. In plants where tanks, planes, trucks, guns and shells—in fact wherever the countless defense materiel are made—clean air plays a vital role in keeping production lines moving at unprecedented speed.

Men who operate machines must breathe freely of clean, wholesome air, and those machines must be protected from the ravages of abrasive dusts that deteriorate the best of equipment or break down accurately finished surfaces.

American Air is proud of the part it is taking in the National Defense effort—AAF air filtration and dust control equipment delivered to manufacturing plants directly engaged in making war materials comprises approximately 80% of our output.

For more than 20 years the American Air Filter Company has pioneered the development of air filtration and dust control and is today the world's largest manufacturer of equipment to eliminate dust. Bulletins describing the various products are available on request. Please address 144 Central Avenue. Canadian companies write Darling Bros., Ltd., Montreal, P. Q.

THE SYMBOL AAF OF CLEAN AIR

AMERICAN AIR FILTER CO., INC. LOUISVILLE, KY

Recommended Minimum Standards For Gas-Fired Winter Air Conditioning Systems and Low Temperature Warm Air Systems

Washington Gas Light Company
Washington, D. C.

[Part 3]

APPENDIX A

Supplementary Suggestions Concerning System

In addition to the foregoing "Minimum Standards", the following items are presented for consideration to further improve heating comfort and the operating efficiency of the system:

1. The use of an automatic clock thermostat or day-night timing device is recommended.
2. The fan should be equipped with a properly labelled summer switch by which the fan can be operated independently of all other controls.
3. In certain installations, return ducts over unexcavated areas, and in unheated attics, garages and the like, should be covered with at least ½ inch insulating material.
4. Registers which include vanes of the horizontal multiple type, adjustable to direct the air downward or registers of equivalent construction, are recommended for certain applications.
5. A volume damper in each return is recommended regardless of the size of the installation.
6. It is recommended that the designer of the duct system pay particular attention to treatment of cold drafts usually occurring near windows, entrances and stair wells.
7. In houses with a heat loss of 150,000 B.t.u. or greater, it is recommended for good heat distribution that two or more separate heating units be installed, each heating a portion of the house and connected to a separate supply and return air system and thermostat.
8. If a two-speed fan is incorporated as part of the unit, the use of an extended plenum type duct system is recommended to aid equal air distribution at both speeds.
9. For economy and decreased variation in register air temperature, it is recommended that insulation be applied to any run of supply duct, the length of which between register and heating unit exceeds thirty (30) feet. This recommendation does not apply to the basement duct work in cases in which some basement heat is desired, otherwise trunk, branches and risers should be covered for full economy.

APPENDIX B

Suggestions on Building Construction

A satisfactory heating system not only embraces consideration of design and installation, but also includes consideration of structural conditions. With this thought in mind the attention of the builder, architect or contractor is respectfully directed to the following items which have an important effect on heating comfort and performance.

1. Cold floors cause unsatisfactory heating conditions. It is recommended, therefore, that whenever floors are situated over unexcavated areas or ventilated spaces such as garages, they be thoroughly insulated with suitable materials properly applied to such portions of the floor. Provisions should be made for the closing of outside vents to unexcavated spaces during the heating season, and wherever possible such spaces should be left well open to the basement to increase the temperature beneath the exposed floor.
2. Heating conditions may prove unsatisfactory in rooms with a relatively high rate of heat loss in comparison to other rooms due to considerable wall, floor, or ceiling exposure, large window area or other causes. Such discomfort arises from a large variation in room temperature with the "on" and "off" operation of the conditioner. It is therefore urged that the heat loss of such rooms be reduced commensurate with other rooms in the house, by the application of insulation to exposed surfaces, and the use of storm sash and weatherstripping.
3. Chimney height above roof peak, flue area, and dirt trap in base of flue, are important points. See section II of the standards.
4. Proper ventilation of the heater room is essential. See section I-B-1.
5. It is recommended that attention be given to the size and lay-out of the conditioner room so that accessibility of all appliances and controls will be assured. See section I-C-1,-2.
6. The importance of giving due consideration to the heating system at the time plans of the house are developed should not be overlooked because by providing favorable space for duct and register loca-

tions and providing six inch partition studs when necessary, heat distribution will be improved, and greater economy of operation effected.

APPENDIX C

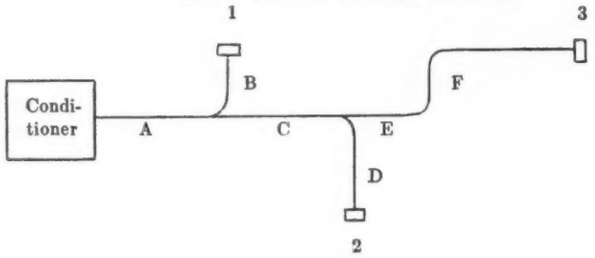
Suggested Method of Determining C.F.M. Requirements *(See plan and data sheet below)*

The graph (right) is presented as a suggested method of determining C.F.M. requirements for winter air conditioning systems. Application of the curves would be as follows:

1. Compute heat loss of each room.
2. Compute temperature drop from furnace bonnet to each register by multiplying the length in feet of trunk, branch and riser, by .8 degree for bare duct or by .4 degree for insulated duct. When the length of run between register and furnace exceeds 30 ft. or the computed temperature drop exceeds 25 degrees, it is recommended that at least the riser and branch be insulated so as to limit the temperature drop to less than 25 degrees.
3. Find the arithmetical average temperature drop to all of the registers and add this figure to a selected design average register temperature not in excess of 135 degrees. The sum will be the design bonnet temperature.
4. Subtract the computed temperature drop to any individual supply register from the computed design bonnet temperature and obtain from the graph the required C.F.M. per 1,000 B.t.u. heat loss corresponding to the register temperature thus determined.
5. The dotted curve indicates the equivalent volume of 65 degrees return air for a given supply register temperature.
6. Finally, adjust the C.F.M. figures determined for each room by multiplying by the ratio of actual bonnet heat output of the conditioner to the heat loss of the house.

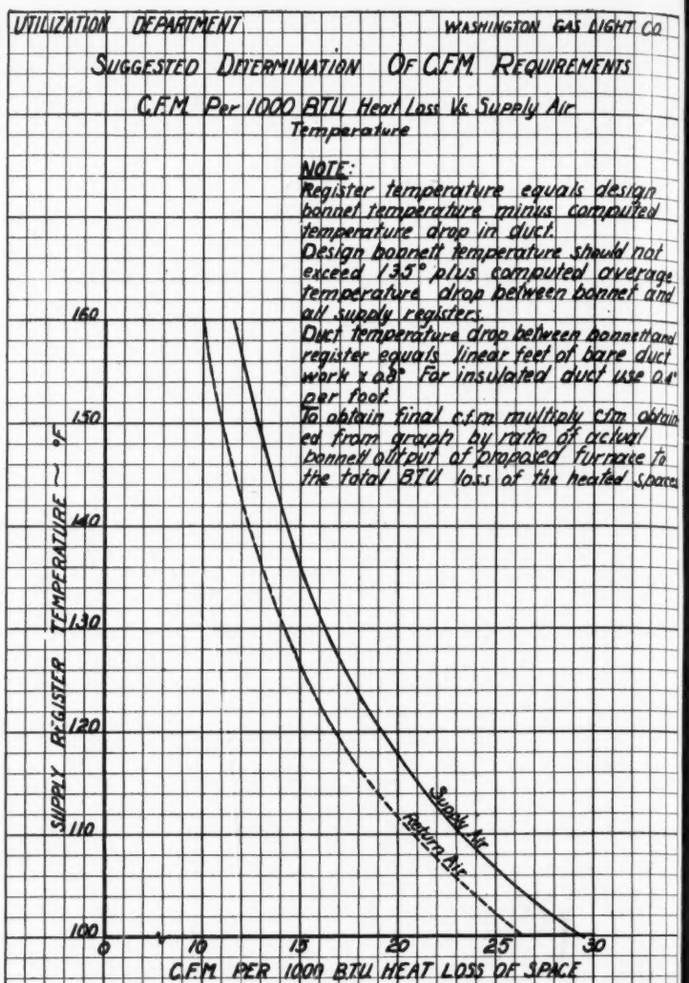
The C.F.M. figures thus obtained should be checked against those required for the minimum number of air changes (average of four for all rooms heated) and the greater C.F.M. figure selected whenever the computed temperature drop between the bonnet and register exceeds the average computed temperature drop (see items No. 2 and No. 3 above). The C.F.M. figure for a minimum of four air changes is found by dividing the cubical contents of the heated space by 15.

Example of Heat Loss Method
(Minimum number of air changes not included)



A - 10' trunk
B - 5' branch and riser
C - 10' trunk
D - 7' branch and riser
E - 6' trunk
F - 16' branch and riser

Note: Sections E and F to be insulated because of length of run to No. 3 outlet.


UTILIZATION DEPARTMENT
WASHINGTON GAS LIGHT CO.
SUGGESTED DETERMINATION OF C.F.M. REQUIREMENTS
C.F.M. Per 1000 BTU Heat Loss Vs. Supply Air Temperature
NOTE:
Register temperature equals design bonnet temperature minus computed temperature drop in duct.
Design bonnett temperature should not exceed 135° plus computed average temperature drop between bonnet and all supply registers.
Duct temperature drop between bonnet and register equals linear feet of bare duct work x .08° For insulated duct use .04° per foot.
To obtain final c.f.m. multiply c.f.m. obtained from graph by ratio of actual bonnett output of proposed furnace to the total BTU loss of the heated space.
SUPPLY REGISTER TEMPERATURE °F
160
150
140
130
120
110
100
Supply Air
Return Air
0
10
15
20
25
30
C.F.M. PER 1000 BTU HEAT LOSS OF SPACE

The example below assumes that the air conditioning unit will be exactly the right size, whereas in most cases the unit will be from 10% to 30% oversize. This means that unless the C.F.M. requirements are correspondingly increased the design register temperature will be exceeded. Merely increasing the fan speed in a system is not the remedy because of the increased velocities which probably would exceed the standards. To properly correlate the proposed heating unit with the duct system sizing, the individual C.F.M. requirements as determined by the method shown should be multiplied by the ratio of the actual B.t.u. output capacity at the bonnet of the proposed furnace to the total B.t.u. requirements of the heated spaces, after which the duct sizes which will limit the velocities to the standards may be determined.

Data Sheet for Example at Left

Room	B.T.U. Heat Loss	Duct Sec.	Total Length	Temp. Factors	Temp. Drop	Actual Reg. Temp.	C.F.M. 1000 Btu (from chart)	C.F.M. Supply	C.F.M Return (from chart)	C.F.M Return
1	5,000	(A)+(B)	15	.8°	12°	138°	14.6	73	12.7	64
2	10,000	(A)+(C)+(D)	27	.8°	22°	128°	16.7	167	14.7	147
3	7,000	(A)+(C)	20	.8°	16°	125°	17.6	123	15.5	108
		(E)+(F)	22	.4°	9°					

20° av. + 130° (av. design register temperature) = 150° design bonnet temperature.

Heat Loss Factors Used In Washington Code

(Other Tables of Factors will appear in December)

The following factors indicate the hourly B.t.u. heat losses per square foot of surface for 70° F. inside temperature and 0° F. outside temperature condition and 15 m.p.h. wind velocity.

Experience has shown that with certain types of construction and installation, operating rate tends to be higher than with other of the same heat loss. The "House Heating Computation Procedure" table has been prepared to compensate for such cases.

It is recommended that for construction not included in the following lists the A. S. H. & V. E. Guide values be used.

WALL LOSSES

(B.t.u./sq.ft./hr./70° diff.)

With Furring or Air Space

	Plastered Direct	Wood Lath Plaster	Foil-coated Sheetrock Plaster	½" Ins. Board Plaster	Blanket Ins.-Lath-Plaster ½" Ins.	Blanket Ins.-Lath-Plaster 1" Ins.
Masonry Walls:						
Brick 8"-10"	25.0	17.5	13.5	13.5	12.0	10.0
Brick 12"-14"	19.5	14.5	12.0	11.5	10.5	9.5
" Brick—4" Tile	23.0	16.5	13.0	13.0	11.5	9.5
" Brick—8" Tile	17.0	13.0	11.0	11.0	10.5	9.0
" Brick—4" Cinder-Block	22.5	16.0	13.0	12.5	11.5	9.5
" Brick—8" Cinder-Block	16.5	13.0	11.0	11.0	10.0	9.0
Stucco on 8" Tile	20.5	15.5	12.5	12.0	11.0	9.5
Stucco on 10" Tile	20.0	15.0	12.0	12.0	11.0	9.5
Stucco on 12" Tile	16.0	12.5	11.0	10.5	10.0	9.0
Stone 12"-14"	28.0	19.0	14.5	14.5	13.0	10.0
Stone 16"-20"	23.5	17.0	13.5	13.5	12.0	10.0
" Stone—4" Brick	29.0	19.5	15.0	14.5	13.0	10.0
" Stone—4" Brick	25.0	17.5	13.5	13.5	12.0	10.0
" Stone—4" Tile	26.5	18.0	14.5	14.0	12.5	10.0
" Stone—4" Tile	23.0	16.5	13.0	13.0	11.5	9.5
Concrete—2"	65.0	31.0	21.0	20.0	17.0	12.0
Concrete—6"	55.5	27.0	19.0	18.5	16.5	11.0
Concrete—8"	32.0	21.0	16.0	15.0	13.5	10.5
Concrete Block— 8"	29.0	19.5	15.0	14.5	13.0	10.0
Concrete Block—12"	22.5	16.5	13.0	12.5	11.5	9.5
Cinder Block— 8"	20.5	15.0	12.0	12.0	11.0	9.5
Cinder Block—12"	14.5	11.5	10.5	10.5	10.0	9.0
" Brick—4" Concrete Block	23.0	16.5	13.5	13.0	11.5	10.0
" Brick—8" Concrete Block	21.5	15.5	12.5	12.5	11.0	9.5
" Brick with Air Cells	26.0	18.0	14.0	14.0	12.5	10.0
Frame Walls:						
*Siding-Sheathing-Studs-Plaster	18.5	14.0	14.0	12.5	10.0	
*Siding Only-Studs-Pl. Base-Plaster	25.0	18.0	17.5	15.0	11 0	
*Siding—1" Rigid Ins. Board-Studs Plaster Base-Plaster	14.5	12.0	11.5	10.5	9.5	
Stucco-Lath-Sheathing-Studs-Plaster Base-Plaster	21.0	16.0	15.5	13.5	10.5	
Stucco-Metal Lath-Studs-Pl. Base-Pl.	34.5	22.5	22.0	18.0	12 0	
√ 4" Brick Veneer-Sheathing-Studs-Plaster Base-Plaster	17.5	13.5	13.5	12.0	10.0	
√ 4" Brick Veneer—1" Rigid Ins. Board-Studs-Plaster Base-Plaster	14.0	11.5	11.0	10.5	9.0	

*Also for 4" stone in place of siding.
√Also for 6"-8" stone in place of 4" brick veneer.

WALL LOSSES

(B.t.u./sq.ft./hr./70° diff.)

With Furring or Air Space

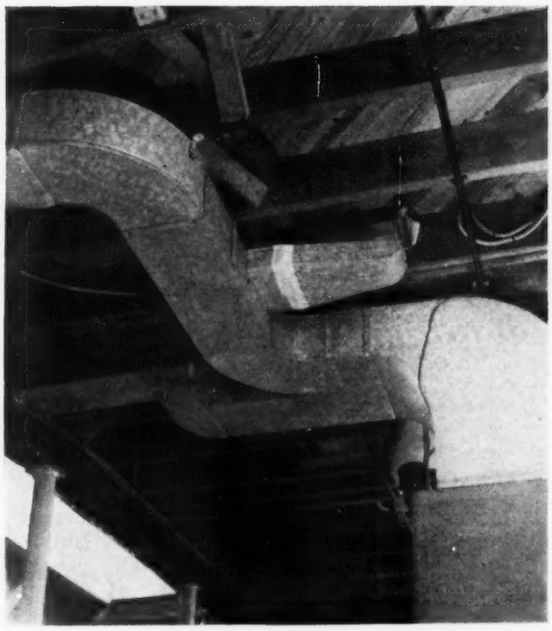
	Both Sides of Air Space Faced with Foil	Foil Curtains Bright on Both Sides Dividing Air Space: 1 Curtain	Foil Curtains Bright on Both Sides Dividing Air Space: 2 Curtains	Mineral Wool Fill, Wood Lath, Plaster: 2" Fill	Mineral Wool Fill, Wood Lath, Plaster: 3⅜"
Masonry Walls:					
Brick 8"-10"	13.0	10.5	9.5	9.0	7.5
Brick 12"-14"	11.5	10.0	9.0	8.5	7.0
4" Brick—4" Tile	12.5	10.5	9.0	9.0	7.5
4" Brick—8" Tile	11.0	9.5	9.0	8.5	7.0
4" Brick—4" Cinder Block	12.5	10.5	9.0	9.0	7.5
4" Brick—8" Cinder Block	11.0	9.5	9.0	8.5	7.0
Stucco on 8" Tile	12.0	10.0	9.0	9.0	7.5
Stucco on 10" Tile	11.5	10.0	9.0	9.0	7.0
Stucco on 12" Tile	10.5	9.5	9.0	8.5	7.0
Stone 12"-14"	14.5	11.0	9.5	9.5	7.5
Stone 16"-20"	13.0	10.5	9.5	9.0	7.5
4" Stone—4" Brick	14.5	11.0	9.5	9.5	7.5
8" Stone—4" Brick	13.0	10.5	9.5	9.0	7.5
4" Stone—4" Tile	13.5	10.5	9.5	9.0	7.5
8" Stone—4" Tile	12.5	10.5	9.0	9.0	7.5
Concrete 2"	20.0	14.0	11.0	10.5	7.5
Concrete 6"	18.0	13.0	10.5	10.0	7.5
Concrete 8"	15.0	11.5	10.0	9.5	7.5
Concrete Block 8"	14.5	11.0	9.5	9.5	7.5
Concrete Block 12"	12.5	10.5	9.0	9.0	7.5
Cinder Block 8"	12.0	10.0	9.0	9.0	7.5
Cinder Block 12"	10.0	9.5	8.5	8.5	7.0
4" Brick—4" Concrete Block	12 5	10.5	9.0	9.0	7.5
4" Brick—8" Concrete Block	12.0	10.0	9.0	9.0	7.5
8" Brick with Air Cells	13.5	10.5	9.5	9.0	7.5
Frame Walls:					
*Siding-Sheathing-Studs Pl. Base-Plaster	13.5	10.5	9.5	9.0	7.5
*Siding Only-Studs-Pl. Base-Plaster	17.0	12.5	10.5	9.5	7.5
*Siding—1" Rigid Ins. Board-Studs-Plaster Base-Plaster	11.5	10.0	9.0	9.0	7.0
Stucco - Lath - Sheathing - Studs Plaster Base-Plaster	15.0	11.5	10.0	9.5	7 5
Stucco-Metal Lath-Studs-Pl. Base-Plaster	21.0	15.0	11.5	10.5	7.5
√ 4" Br. Veneer-Sheathing-Studs-Pl. Base-Plaster	13.0	10.5	9.5	9 0	7.5
√4" Br. Veneer—1" Rigid Ins. Board-Studs Pl. Base-Plaster	11.0	9.5	9.0	8.5	7.0

*Also for 4" stone in place of siding.
√Also for 6"-8" stone in place of 4" brick veneer.

By R. C. Nason

[Defense House Heating]

Low Cost "Loop" and Depressed Utility Room

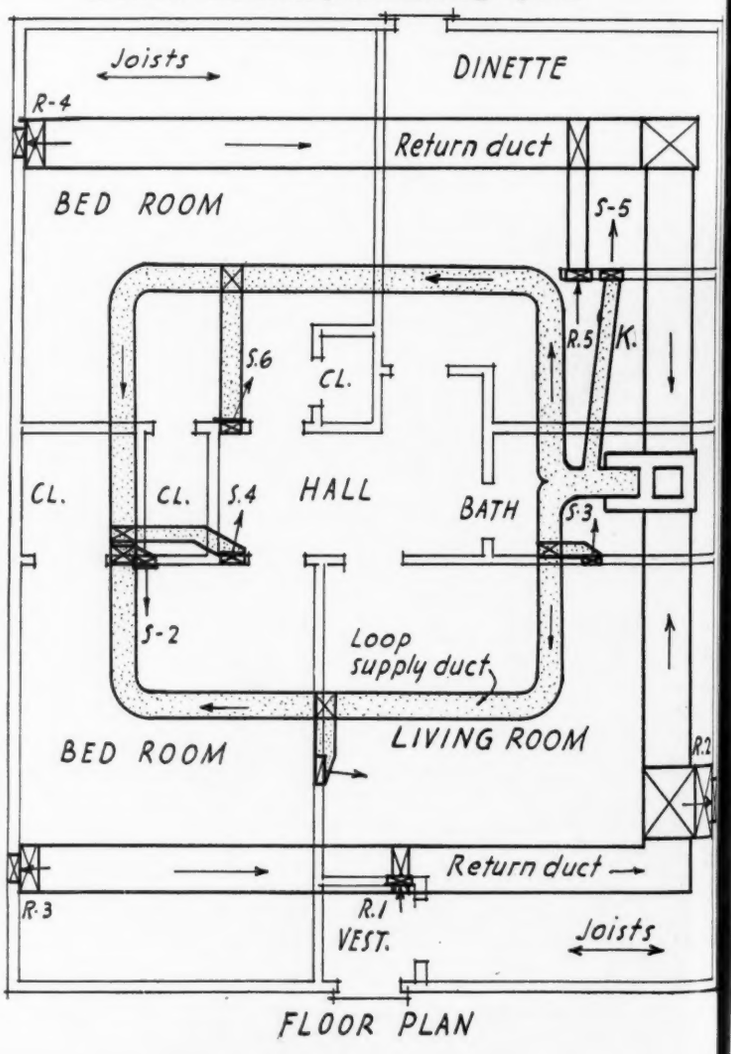


Exterior of house heated by a "loop" and the start of the "loop" as it leaves the furnace. The plan below shows location of loop in basement and register take-offs. Return is between and across joists—all straight pieces.

INSPECTION of recently constructed small homes in Long Island defense areas, the survey involving houses picked at random from about 1000 dwellings, reveals renewed effort to provide adequate comfort at low cost. Not all buildings examined were built nor are being sold under the publicized Title 6 provisions of the National Housing Act. In a majority of instances, nevertheless, the sellers offer to sell them under Title 6 if prospective owners so request.

Restrictions under the aforesaid FHA arrangement are held, in this area, to be rigid. This includes qualifications of builders and necessity of contractors providing faultless winter air conditioning plants of, it appears, sundry varieties as to design and method.

One contractor, to reduce costs, installed warm air distributing duct systems of the "loop" arrangement wherein instead of there being several separate leaders to as many rooms there is a single rectangular leader of uniform section that makes the entire circuit, with branch ducts going to individual rooms. The "loop" photographed has six warm air branches. The returns are separate ducts between and across joists. The heating unit was forced-fan, oil-fired air (vaporizing) conditioning type. Duct and installation costs in such layouts were said to be lower than duct arrangements with all separate leaders. There appears to be no sacrific to heating effectiveness and efficiency.



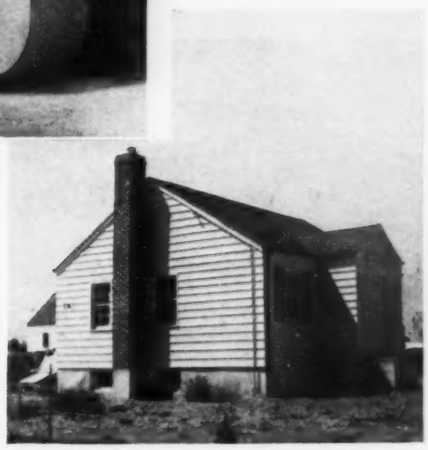
FLOOR PLAN

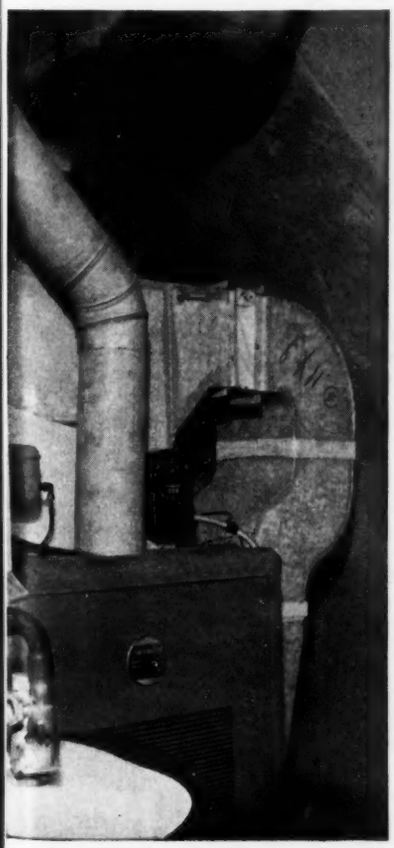
Three pictures at top show small house with basement in which individual round pipe leaders and a unit register box and rectangular duct make erection easy and economical.

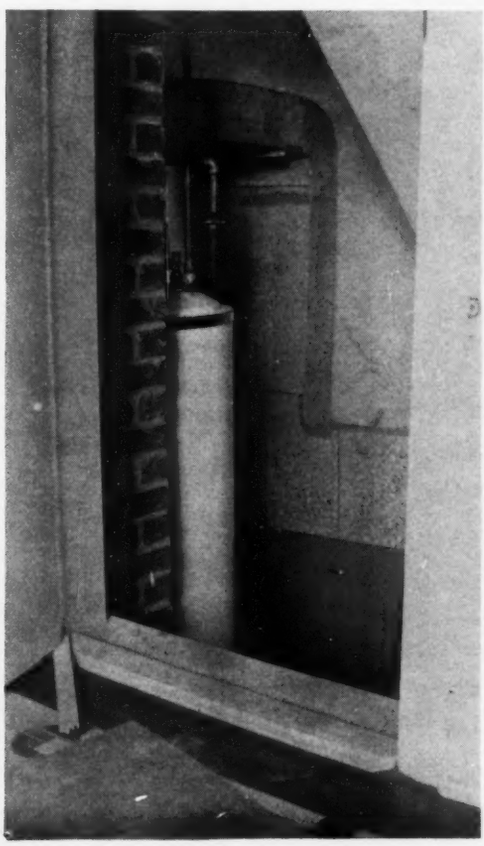
Two pictures below show cellarless, depressed utility room installation. Usually a full concrete slab underlies the entire house.

Utility rooms containing furnaces and water heaters, plus brooms and vacuum cleaners, often are used for storage of garden hose and sundry purposes. Such rooms usually are centered and their floors are about 3 feet 6 inches below the kitchen floors, to which they usually are connected by steps. This allows good heating "head" for both steam and warm air methods, offers convenience for equipment servicing and generally is deemed superior to exterior utility rooms. Rooms are about 6 feet by 8 feet in size, well built, with metal lath and concrete walls and ceilings. Floors usually are integral with the concrete pans that are under the entire structure.

In one development hand-fired, round casing warm air furnaces have round leaders that run from the bonnet directly to the ceiling, make a full elbow there and progress to the rooms to be heated as rounds and are connected just under the floor to square elbows that join register boots.

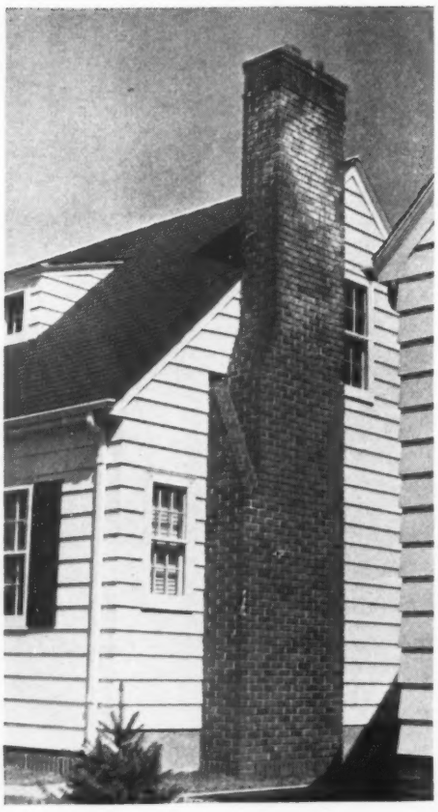


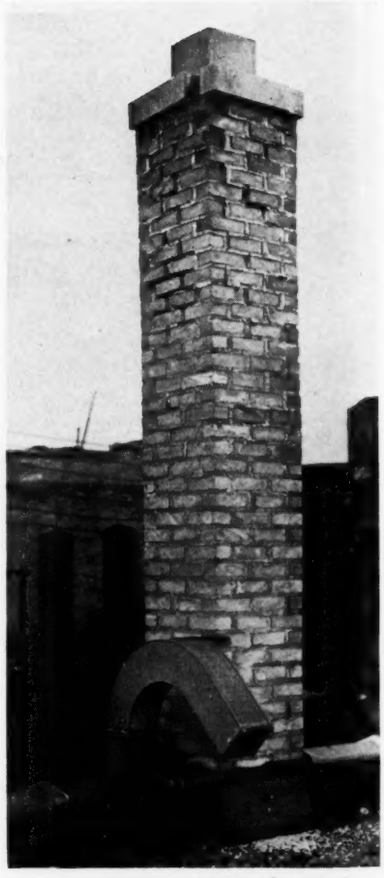




Leaders are bright tin in some instances, galvanized, exposed steel in others. Obviously the reasons are—first, low installation and fabrication cost and, second, low fuel cost in operation. Records reveal that not over five tons of hard coal were used in this type of installation per home owner, taking last year as a criterion and four tons per season was the general rule. Heating contractors were said to be receiving an average of $250 for such plants installed in four and five-room dwellings. Layouts have but a single return duct.

(Continued on page 93)





Left—The upper half of this chimney will have to be rebuilt because condensation has destroyed the mortar bond. Center—Poor joints in the flue lining permitted sulphurous acid to destroy the mortar in two heating seasons. Right—Heavy condensation in two heating seasons, plus the effect of condensation freezing in the joints, has practically destroyed this chimney.

The Problem of

Condensation in Chimneys

By H. M. Betts

Senior Heating Engineer

Department of Buildings, City of Minneapolis

DURING the past five or six years there has come to the attention of the City of Minneapolis Building Department reports of an increasing number of chimney failures due to disintegration of the mortar used in laying up the brickwork. In a number of instances loose bricks have fallen from the tops of such chimneys, narrowly missing children at play in the yard below. Needless to say, should one of these bricks have struck a child it would have resulted in serious injury if not death, and furthermore would undoubtedly form the basis for a lawsuit.

In attempting to ascertain the cause of these failures it was found that almost invariably water entering the joints was responsible. It is a well established fact that in climates where alternate freezing and thawing temperatures occur, water is one of the greatest causes of masonry failure where it is given the opportunity to enter the joints.

Having determined that water was the cause of these failures, the next question was the source of this water. Obviously, a poorly capped chimney would permit rain or melting snow to enter the mortar joints which upon freezing would expand and cause the bond between the brick and mortar to be broken. This would, in time, loosen more bricks and the upper part of the chimney would eventually become merely a pile of bricks laid together without a bond.

However, it was observed that in many cases chimney caps were in good condition and that the moisture which had caused the chimney failure or had seeped through the flue lining joints

and badly stained the chimney brickwork, had its origin within the flue iteself. It was further observed that the fuel used in the heating plants attached to such chimneys was gas in by far the majority of cases.

Sulphurous Acid Attacks Mortar

In the combustion of the mixed gas distributed in Minneapolis, about 8 gallons of water per 1,000 cubic feet of gas is produced and must be disposed of up the chimney as water vapor. This also holds true for oil, but in smaller quantities. This water vapor must be conducted to the outer air as rapidly as possible, at the same time maintaining its temperature above the dew-point if condensation is to be avoided. Where condensation does occur we have not only plain water to contend with, but also small concentrations of sulphurous acid which attacks the lime in mortar and cement and renders the mortar a non-cohesive mass of about the same value as so much sand.

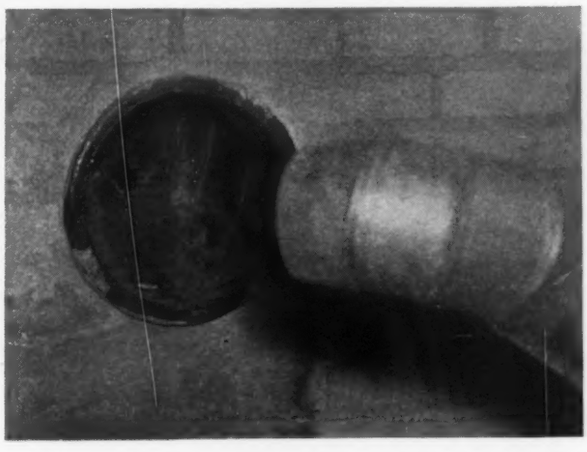
It is plain to be seen, therefore, that if a chimney is to continue to fulfill its function of conducting the products of combustion from the heat generator to the outer air over a period of years without falling to pieces it must be so constructed that if condensation of flue products does occur within the flue lining the joints must be water tight and the condensation so formed may be disposed of before coming in contact with any mortar or concrete.

The darker upper portion of this chimney shows the result of condensation forming near the top of the chimney and running through the joints of the brick work. Even the bricks are saturated.

Glazed Bell and Spigot OK—if?

Glazed bell and spigot joint sewer tile as a flue lining is possibly somewhat superior to the conventional butt joint flue lining, but only when the bell and spigot joints are laid with the bells up and when a suitable acid-resisting cement is used for the joints or the joints are caulked with lead wool. Where offsets are made around first floor fireplaces, fittings should be used which will permit the making of water tight joints without malaligning of the fittings. An elbow of the proper length at the male end should be placed at the base of the flue so that condensation may be gathered in a suitable receptacle or piped to a floor drain.

The foregoing construction, however, is not, in the opinion of the writer, the best solution to the condensation problem for a number of reasons, as evidenced by some of the accompanying photographs of actual chimney failures. First, the chimneys on practically all residences are constructed within a short period of time, say, one to two days. It is a physical impossibility for a building inspector to be present during all the



Right—The contractor had the bright idea of punching a hole in the elbow of the flue tile to allow the condensate to drop into the chimney base. The result was not so good, as shown by the photograph at the left. Left — Sulphurous acid condensate gathered at the smoke pipe entrance and, having no means of escape, has penetrated through mortar and block, with this result.

Why sound, tight joints are sometimes impossible to get in bell and spigot sewer tile is plainly indicated by this pile of tile ready to become somebody's chimney lining. No tile at all would be just as satisfactory.

time a chimney is being built, consequently he has no way of knowing whether the proper joints have been made. If the joints are not water tight or defective tile has been used, the chimney may not show indications of leakage until the heating season is fairly well advanced—then it is too late to remedy the situation.

Flue Must Have Sufficient Area

Second, a chimney flue should be of sufficient internal cross-sectional area to serve any heating plant which may be connected to it, whether the fuel be coal, oil or gas. Since coal firing calls for a flue of not less than 70 square inches in area, this means an 8 inch x 12 inch rectangular flue, or a 10 inch diameter round flue. When an oil-fired boiler or furnace is connected to such a chimney the volume of flue products is somewhat less than with coal firing, and if the flue gas temperature be abnormally low, say, 250 to 300 deg. F., the rate of flue gas travel will be sluggish and condensation will be almost sure to result, particularly if it be an outside chimney.

If gas is used as fuel, the required chimney flue area is such that only about a 5 inch or 6 inch diameter flue is required. Since the flue gas temperature or gas fired appliances is inherently low, it is almost a foregone conclusion that with a large chimney flue the flue products will be almost immediately chilled to their dew-point, resulting in condensation. Such a condition is also conducive to very sluggish draft and poor venting at the appliance.

Flue Gas Must Stay Above Dew Point

In view of the foregoing facts it should be obvious that the sooner flue products containing appreciable quantities of water vapor can be conducted to the outer air maintaining a temperature above their dew-point all the way, the smaller will be the possibility of their condensing. This is particularly true where gas is used as fuel and in some cases where oil is used. The most practical method of accomplishing this is by the insertion of an acid and corrosion resisting slip-in liner within the chimney flue after its construction. This liner should have the same cross-sectional area as the vent pipe from the appliance.

It has been our experience that where gas-fired appliances have been vented into an over-sized chimney, resulting in excessive condensation and spillage of flue products under the skirt of the

(*Continued on page* 106)

These three photographs show that punching a hole in the smoke pipe and adding a "drip" does not always provide passage for all the condensation generated. In these chimneys there was so much condensation that most of the acid water came through the chimney base and missed the can.

Repair, Replace, Recondition—

To Meet Defense Problems

Checking the furnace to recommend reconditioning can be a "hit-or-miss" procedure which neither impresses the customer nor tells you anything definife. It can be a "look and a spit" or it can scatter the furnace all over the basement. The happy medium is the procedure which leaves the customer with a good taste in his mouth and the contractor with useful facts—a procedure based on a check list similar to the sheet used by your automobile service station. Here is a suggestion.

Check List For "Tuning" The Furnace

By S. Konzo
Special Research Associate Professor
Engineering Experiment Station, University of Illinois

FURNACE CONTRACTORS are too often not overly excited about performing smaller furnace repair jobs. These smaller jobs, rightly and completely performed, can be the foundation upon which the reputation of a furnace dealer is built. The homeowner should be made to realize that the cheapest repair estimate is not necessarily the honest estimate, nor is it necessarily true that every heating contractor is out to "sell a bill of goods" whether the homeowner needs it or not.

I believe it essential for a heating contractor to explain carefully what a complete job of overhauling and modernization involves and then *set down in writing* the more essential items agreed upon to be performed on that particular job. Give your customer a *check list,* similar to that which the automobile service station gives the customer who brings in a car for greasing, oiling, or tuning. Furnace manufacturers can help protect their own reputation by supplying check lists for the use of their dealers and by instructing their dealers on giving adequate complete service, in accordance with the check list. A suggestion for a simple check list is shown in Table 1, next page.

A few additional comments may be worth emphasizing:

1) All hand-fired cast iron furnaces converted over to stoker, oil, or gas firing, should be completely re-set. Recently a homeowner assured me that their cast-iron furnace had never been cleaned, re-set, or repaired in 21 years. That in itself was a most interesting bit of information. What was even more interesting was that a stoker had been installed the previous year and the installer did not re-set the furnace. The result was not satisfactory.

It should be realized that in a hand-fired coal furnace the combustion chamber is under a slight suction practically all the time, so that any air leaks tend to dilute the flue gases. In a stoker-fired installation, there exists some possibility of a very slight pressure in the combustion chamber just as the stoker begins operation. This possibility becomes greater as the flue passages become filled with fly ash. Hence a furnace may operate satisfactorily as a hand-fired furnace and yet prove leaky after a stoker or oil burner is installed, *unless* the furnace is completely dismantled and re-set.

2) Furnace cements do not do so well when used merely to putty a crack in the furnace joints. It has always been a source of amazement to

TABLE I

Check List

(To be filled out with the home owner)

	Check work to be done
1. The furnace casing is to be removed to permit inspection of furnace.	.....
a) If joints in furnace appear to be in good condition, the furnace will not be dismantled,	.....
b) If joints in furnace need recementing, the **entire furnace will be dismantled.**	.....
2. Furnace bonnet to be removed. Return ducts and warm air leader pipes to be taken down and cleaned, if necessary.	.....
After such cleaning, the ducts are to be installed and all joints are to be covered with asbestos paper to make them air tight.	.....
The leader pipes to the following rooms need replacement	
3. A two-inch cement foundation to raise the furnace off the floor, and the placement of a sheet metal piece below the furnace, is excellent practice and can be supplied if requested.	.....
4. All old cement from furnace joints to be removed by chipping, scraping and brushing.	.....
Furnace to be completely reassembled with ..... lb. of ..... type furnace cement.	.....
Casing to be replaced and **all joints to be stripped** with asbestos paper.	.....
5. The following parts of the furnace require replacement or repairs.....	
6. Smoke pipe to be taken down, cleaned, and replaced.	.....
The following repairs are advisable.....	
7. The plan fails to meet Code requirements in the following particulars.....	
We suggest the following procedure.....	

me to see how stingy some installers are with furnace cement. They ration it out in thin transparent strips as if it stood No. 1 in the priority list.

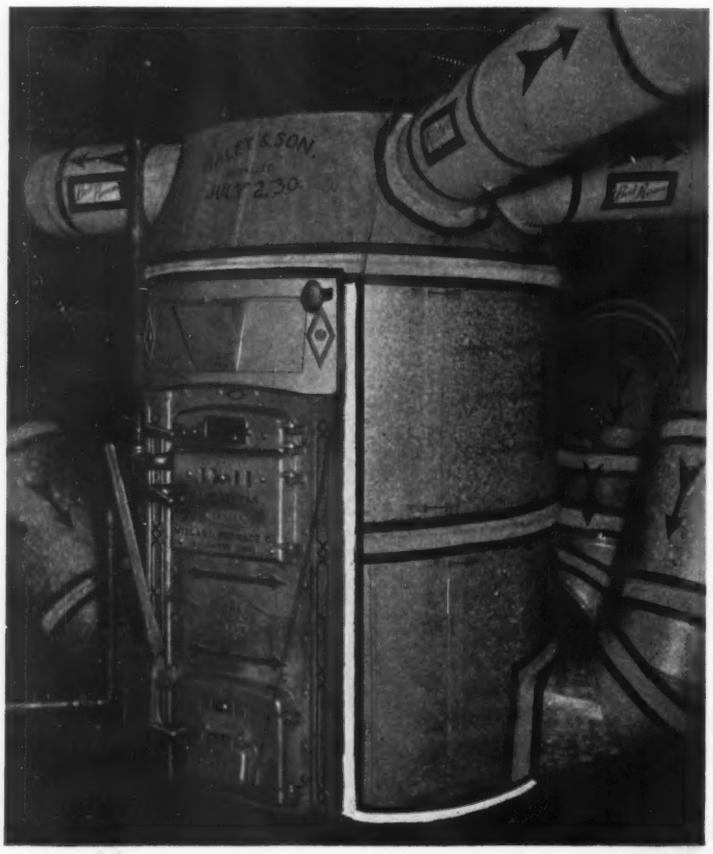
3) All the joints in the entire duct system in a gravity warm air system should be sealed with asbestos paper. This is particularly necessary where coal is used as a fuel. Asbestos paper strips should be placed around the collars in the bonnet, on the joint between the furnace front and the casing, around every casing joint including the bottom ring, on every warm air pipe joint, and every return air pipe joint. All the time and material wasted in covering the entire warm air leader pipes with one or two layers of thin asbestos paper could be put to much better use by covering only the joints. (Fig. 1.)

4) Whenever coal, ashes, or clinkers are handled, the possibilities of minimizing dust should be considered. The space existing around each stack as it enters the studding should be stuffed with incombustible material, such as mineral wool. (Fig. 2.)

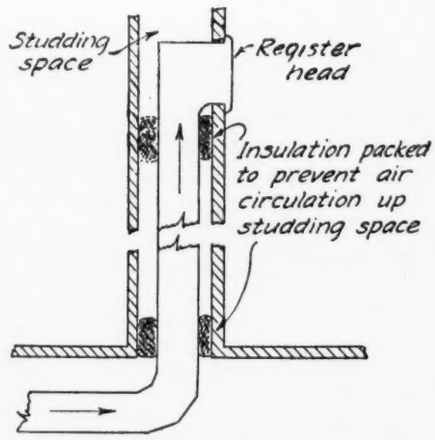
5) Fireclay linings for firepots seem to have a definite place in repair work.

6) The removal of soot from the inner walls of the furnace will increase the heat transfer from the flue gases to the circulating air. The reports of fuel investigators of Standard Oil, of Bureau of Standards, and of Bureau of Mines indicate that in oil burning equipment a ⅛-inch layer of soot will reduce efficiencies from 5 to 8 per cent. For a given oil input, the increase in flue gas temperatures due to the ⅛-inch layer of soot was found to be quite marked. (Fig. 3.)

7) If a furnace part cracks, or bulges, or burns out, the wise installer will not merely replace



Left—Fig. 1—Taping all joints in the casing and piping is a beneficial practice, especially in coal-fired plants. It keeps heating air in and basement air out. Here is how one contractor does it.



Above—Fig. 2—Stacks in a studding space should be packed to eliminate air circulation in the space and basement air passage to upstairs rooms. From the "Yardstick."

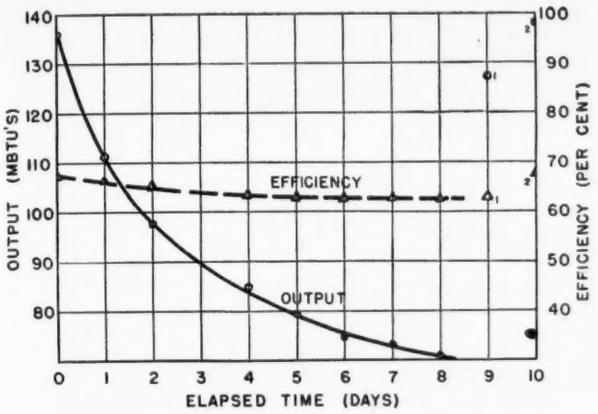


Fig. 3—Effect of soot on boiler output at constant stack temperature (600°F) as reported in "Effect of Soot on the Rating of an Oil-Fired Boiler," National Bureau of Standards. In these tests the oil input was reduced to maintain a constant stack temperature.

the part, but will also investigate carefully to find the cause. And there usually is a cause. Furnace plants which have not been installed in accordance with the Gravity Standard Code are usually deficient in air carrying capacity, particularly in the return ducts. The new Standard Code Application Manual issued by the National Warm Air Heating and Air Conditioning Manual affords a convenient method of making checks on the carrying capacities of both the leader pipes and the return ducts. *Every retailer should obtain a copy from his manufacturing supply.*

8) Note particularly the following points:
   a) Where does the injury to the furnace occur?
   b) What relation does the location of the injury bear to the return duct boot connection?
   c) Does the casing get excessively hot?
   d) Is the galvanizing layer on the casing burned?
   e) Does the basement get unusually warm due to lack of air circulation of the furnace?

   One of the simplest means of checking whether the resistance in the return duct is excessive or not, is to temporarily open a hole at the bottom of the casing to allow the basement air to enter the system. If the return duct is unduly restricted, the temporary opening will admit large quantities of cool air, sufficient to cause a noticeable drop in the bonnet air temperature. The return air duct system should be improved.

Practices Which Damage a Furnace

9) Even in a correctly installed system, damage to the furnace may be caused by excessively high combustion rates caused by poor handling of the draft dampers. The capacities of furnaces rated by the National Warm Air Heating and Air Conditioning Association were based on a combustion rate of 7.5 lb. of coal per square foot of grate surface per hour. In the usual furnaces, a 7.5-lb. combustion rate is accompanied by a flue gas temperature of about 750 deg. F.

   If the smoke pipe begins to glow a dull red, the flue gas temperatures are at least 1000 deg. F. and the combustion rate is probably greater than 10-lb. per sq. ft. per hr. In a properly controlled and operated plant, such rates of combustion should seldom be obtained and then only for a short duration.

10) Reducing house temperatures at night by banking the fuel bed may save some fuel, but such savings will be completely wiped out if the homeowner forces the furnace to the limit during the morning pick-up period. Longer furnace life will be obtained if the pick-up period is prolonged and accomplished in two or more stages.

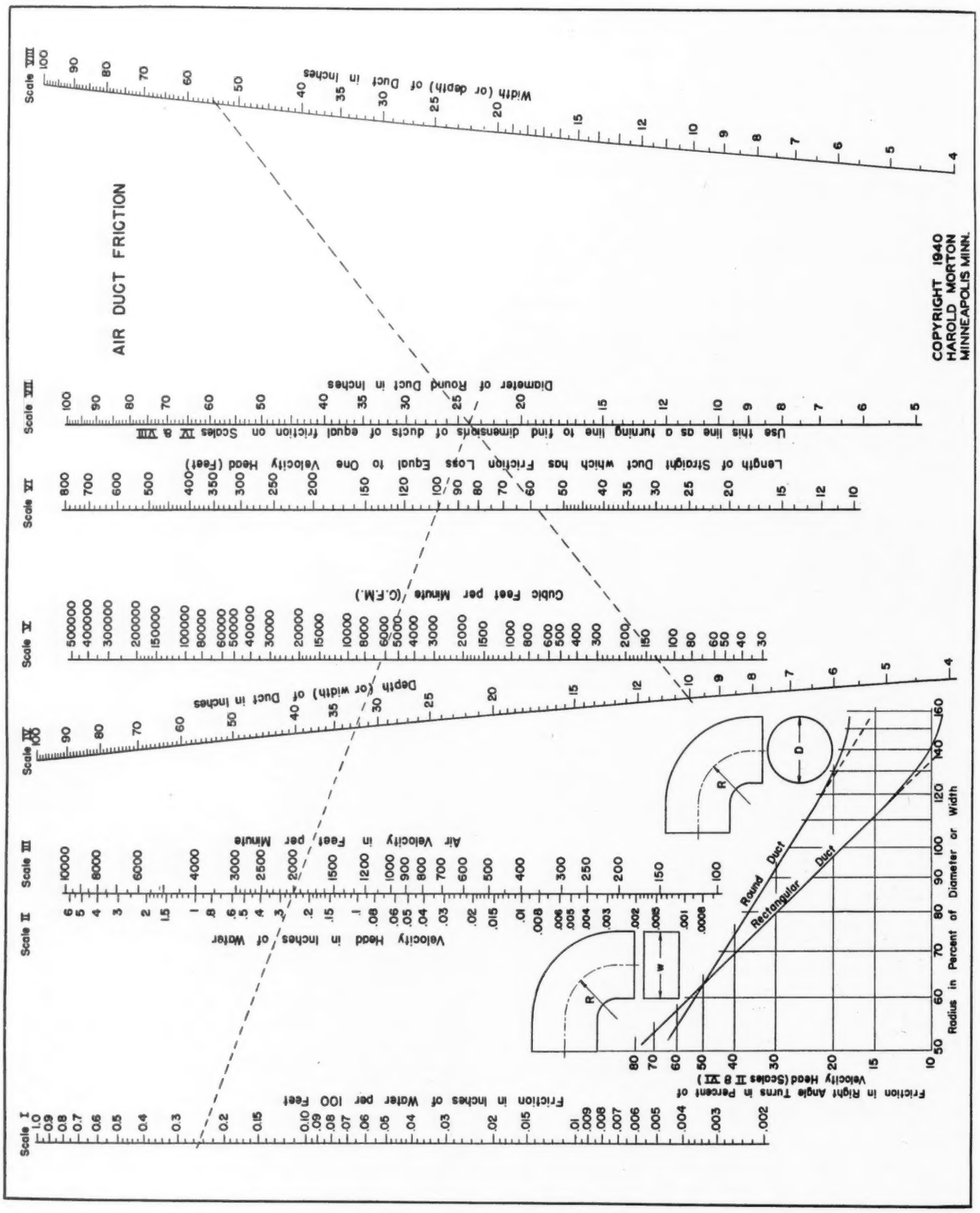
11) Properly controlled and operated, warm air furnaces have a record of extremely long service. One furnace in the Research Residence was operated close to 15 years with all varieties of fuel and even under overload conditions, seldom encountered in a properly operated plant. The furnace seems to be in excellent shape and shows no sign of deterioration. There are few items in a household which can claim to be almost as good as new after 15 years or 3000 days or 72,000 hours of service. Compare these figures with an

(Continued on page 92)

◆

Fig. 4—Cleaning the furnace has now become Step Number One in practically every Repair, Replace, Recondition procedure. Only by careful cleaning can further recommendations be safely determined.

Air Duct Friction Chart


AIR DUCT FRICTION
COPYRIGHT 1940
HAROLD MORTON
MINNEAPOLIS MINN.
Scale VIII
Width (or depth) of Duct in Inches
Scale VII
Diameter of Round Duct in Inches
Use this line as a turning line to find dimensions of ducts of equal friction on Scales IV & VIII
Scale VI
Length of Straight Duct which has Friction Loss Equal to One Velocity Head (Feet)
Scale V
Cubic Feet per Minute (C.F.M.)
Scale IV
Depth (or width) of Duct in Inches
Scale III
Air Velocity in Feet per Minute
Scale II
Velocity Head in Inches of Water
Scale I
Friction in Inches of Water per 100 Feet
Friction in Right Angle Turns in Percent of Velocity Head (Scales II & VI)
Radius in Percent of Diameter or Width
Round Duct
Rectangular Duct
D
R
W

Air Duct Friction Chart

By Harold S. Morton

Sutherland Air Conditioning Co., Minneapolis

THE air friction data by means of which duct work is designed are usually obtained from several different sources, necessitating reference to a number of different charts and tables. The writer has therefore assembled all the necessary information on the single air duct friction chart which is reproduced on the facing page. Engineers who do a considerable amount of duct layout work have found it to be a great time-saver, and to be so easy to read that the likelihood of errors is greatly reduced.

Before using the chart, it is customary to rough out a line drawing of the proposed duct work and mark down the cfm passing through each section.

Chart Shows Several Answers

In order to use the chart, a transparent ruler or triangle is laid across the chart covering scales I-VII inclusive. It is necesary to establish two points on separate scales in order to define conditions in any specific piece of duct work. Cfm is, of course, one determining point, and we may arbitrarily assume the air velocity for the second. Having thus established a line on the chart, we can read on scale I the friction in inches of water per hundred feet of straight duct; and on scale II, the velocity head in inches of water. Scale III marks the velocity which was assumed in establishing the line. (*Do not read scale IV on this line.*) Scale V marks the cfm assumed in establishing this line. On scale VI we read the number of feet of straight pipe in which the friction loss is equal to one velocity head; and on scale VII we read the diameter of round duct which will handle the given cfm at the assumed velocity with the indicated friction loss per hundred feet.

It will be noted that any line laid across the six scales fully defines all conditions relating to the movement of a given quantity of air in a given size of duct.

Scales IV, VII and VIII are used for determining the rectangular duct with friction per hundred feet equivalent to any round duct. Using the diameter of the round duct as shown on scale VII as a turning point, a line drawn across scales IV, VII and VIII will show the width and depth of the rectangular duct on scales IV and VIII.

At the lower left, the friction in right angle turns is shown for both round and rectangular ducts. The friction depends on the radius of curvature and is expressed as a percentage of the velocity head. By taking the indicated percentage of the velocity head as read on scale II, we determine the friction loss in the turn in inches of water, or by taking the indicated percentage of the reading on scale VI, we determine the equivalent linear feet of straight duct having a resistance equal to that of the turn.

Designing to Equal Friction

It is sometimes desirable to design various portions of a system of duct work on an equal friction basis. In order to do so, it is only necessary to select a point on scale I and align it successively with the several cfm values on scale V. Each line thus established will determine the velocity and the size of the required section of duct.

It is equally convenient to use this chart in checking back on existing duct work. Scales IV, VII and VIII quickly determine the round equivalent of any piece of duct work. The point thus established on scale VII can be joined to a required cfm to show immediately the velocity and friction; or it can be joined to an assumed velocity to show the resulting friction and cfm; or can be joined to a permissible friction value and show velocity and cfm.

One of the greatest values of using such a chart lies in the ease with which readjustments can be made when it becomes obvious that the original design assumptions do not work out to the best advantage. When using slow and cumbersome methods or calculations, a person is disinclined to recalculate a job unless it is absolutely necessary, but when using a rapid calculation, if one finds that the assumed velocity gives too high a friction value, it is merely necessary to swing the line around until a satisfactory set of values is found. Any thing which speeds up the process of carrying out routine computations and which is susceptible to re-checking or readjusting tends to increase accuracy and to improve the standard of engineering work.

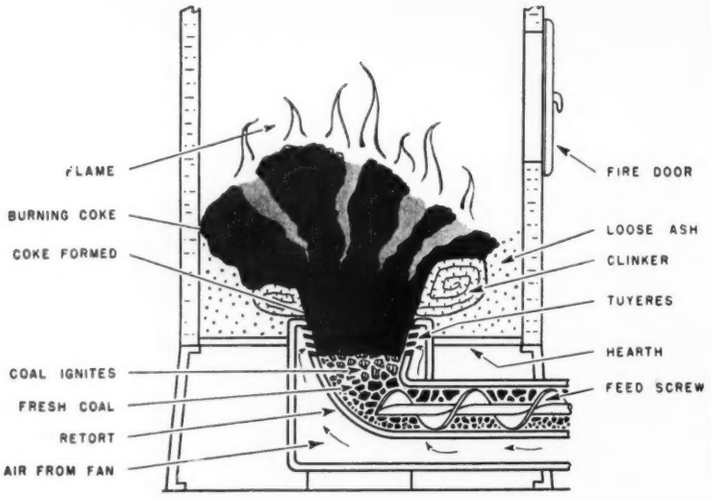


Fig. 1—Typical good fire a few hours after attention. The relationship of stoker retort, coal, coke, clinker, ash is indicated.

Rudiments of Small Stoker Operation

By S. H. Viall

Chief Combustion Engineer
Chicago, Wilmington & Franklin Coal Company

This article, first in a series of copyrighted articles published, appeared in The Rescreener, house organ of the Chicago, Wilmington & Franklin Coal Company, under the title—"Along the Firing Line." The articles are, we think, about the simplest, easy-to-understand discussions of small stoker operating problems in the long list of published material on stoker firing. They should tell readers what to do to insure customer satisfaction.

To secure good results with a stoker, an understanding is required of a few simple rudiments about coal feed, air supply, thickness of fire and cleaning of the firebox. The fact that more than 80 per cent of the calls for service result from neglect of these fundamentals, is evidence that stoker operators could profit from an explanation of why the fuel bed should be deep, why the air supply should be reduced to a minimum, and why the firebox should be kept reasonably free of refuse.

There are many variable conditions that affect the results obtained with a stoker. Instructions cannot be as specific as each owner might desire, but those persons familiar with the details of stoker operation will readily understand the statements made in these articles. Many people may find it advisable to read and study the text carefully and then compare the statements with their own experiences. The statements are worded with particular reference to the *domestic sizes*, although the explanations are fundamental and apply to *all sizes* of underfeed stokers, including those used in apartment buildings, schools, commercial buildings and factories. Representative conditions will be illustrated in the diagrams.

The methods that will be used to indicate coal, coke, ash, clinker, etc., are illustrated in figure 1. That diagram represents a typical stoker fire in good condition, a few hours after it was last attended. Figure 1 is proportioned for a firebox about 26 inches across and 13 to 14 inches from the bottom of the fire door to the hearth.

What the Fire Tells Us

Let us look at figure 1 and note the characteristics illustrated. Segregation of the different sizes of pieces is occurring as the coal moves from the hopper and through the feeding tube. The small pieces work to the bottom, leaving the coarser pieces on top. In the retort the smaller pieces are pushed to the "rear" and the coarser ones rise in the "front." The larger air spaces in the coarse coal permit it to burn faster. For this reason the fuel bed becomes deeper opposite the feed tube. The largest clinkers form directly above where the coal enters the retort, because it is in this section that the most burning takes place.

Coal usually heats to an igniting temperature just below the lowest tuyeres, unless the coal is feeding faster than it ignites. As the coal burns, heat changes it into coke, often in the upper part of the retort, especially during the period when stoker is "off." Clinkers will form close to the retort and loose ash will accumulate around the outer edges of the firebox, except in installations where the space between the retort and edge of the firebox is so small that the high temperature fire extends to the outer edge and produces clinkers that fill the space.

"Good" Fire Is the "Steady" Fire

A good fire is one that furnishes a steady supply of heat to the building heated. The same average amount of heat could be supplied by alternate intervals of over and under heating, just as one could make a journey in an automobile, alternately forcing it to 70 miles, then coasting to 20, forcing to 70 and again coasting to 20, but isn't it more comfortable to drive at an even pace? Isn't it more comfortable in the home to maintain an even temperature?

To maintain this even temperature the fuel bed must be deep. With the rate of coal feed and air supply properly adjusted, the fuel bed will be fairly deep, though it may have a ragged appearance. Normally, when the fan is running, the flame should be fairly lazy and almost dull yellow in color. The space around the retort available for refuse governs the maximum amount of ash and clinker that should be permitted to accumulate.

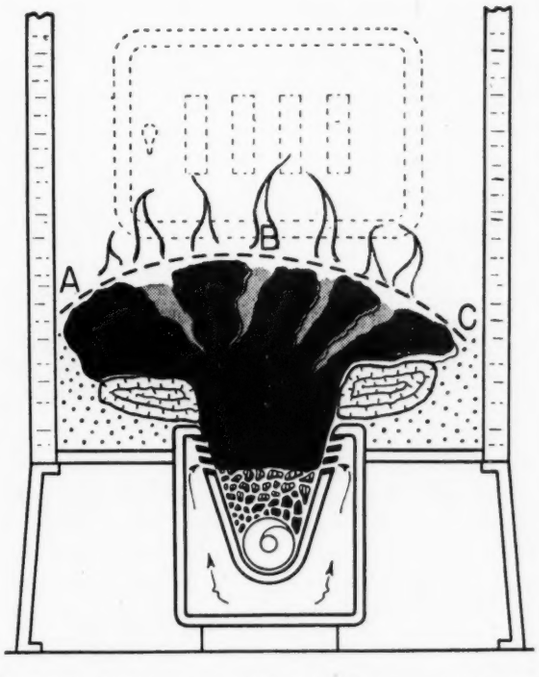


Fig. 2—Typical deep fire, filling hearth area, with a large area for releasing heat.

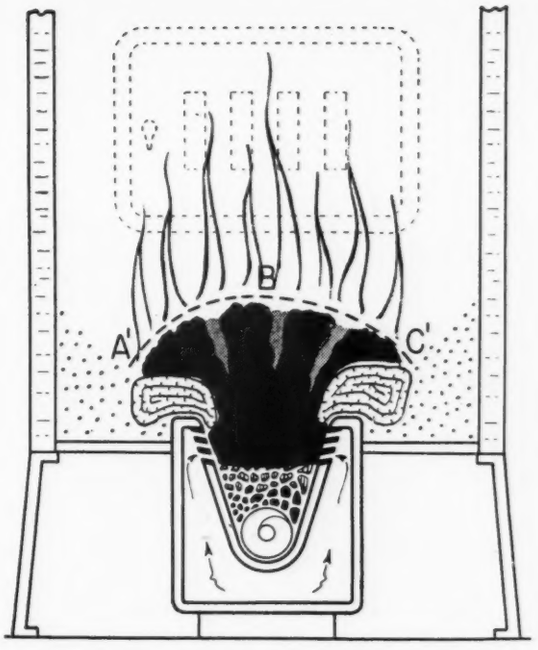


Fig. 3—Typical thin fire possessing only a small area for release of heat.

A series of diagrams contrasting conditions between deep and thin fuel beds will be given to illustrate how a deep fuel bed gives more satisfactory results.

Figure 2 represents a fairly deep fuel bed similar to the fuel bed in figure 1, except that the figure 2 diagram is across the center of the fuel bed and retort at right angles to the length of the coal feeding screw. The distance A B C across the top of a deep fire, as in figure 2, is greater than the corresponding distance A′ B′ C′ of a thin fire as in figure 3. The top area of a deep fire is often 2.0 to 2.5 times the top area of a thin fire. The larger surface and the greater depth of a deep fire means more weight of burning fuel in the firebox.

Heat Release During Fan "Off" Periods

During the "off" periods, while the fan is idle, natural draft is drawing air through the fire. If the fire is deep there is more material on which this air can work, more heat is liberated, and there is a better supply of fuel in the firebox when the fan starts again. The fire bed stays hotter and in better condition to pick up quickly when the fan starts. The steady heat release during the "off" period and better condition of the fire when the fan starts, produces a more uniform temperature in the building heated. Furthermore, the stoker does not operate as often.

Figure 3 represents a comparatively thin fire in the same size firebox as figure 2. For this thin fire to release the same amount of heat as the large one, each square inch of surface must burn

coal much faster, just as the small child must run in order to keep up with his father who is walking. The higher rate of burning per square inch develops a higher temperature and causes the smaller fire to appear brighter and more vigorous than the large one, even though the total heat liberated by the thin fire may not be greater. In figure 3 the higher rate of burning per square inch of surface with a small fire is indicated by the fast traveling, long, straight flames, as contrasted with the lazy, short, curling flames of the deep fire in figure 2.

Air that passes through a firebox but is not used in combustion wastes the heat it picks up. Natural draft, when the fan is idle, may burn the fuel of a thin fire so low that there is not enough fire to use all the air and again excessive quantities of heat are lost to the chimney. If, when the fan starts, there is not sufficient fuel to make immediate use of the increased supply of air, the heat lost to the chimney is greatly increased and continues until the fire is deep enough to use all the air supplied.

Proper Depth of Fuel Bed

For good results, the fuel bed, with the smallest underfeed stokers, should be *at least* as deep as the shortest distance across the retort opening at the top of the casting. A depth of fuel bed 1½ times this distance is often beneficial.

There are three factors involved that affect the depth of fuel bed:

1. Rate of burning.
2. Width of retort.
3. Per cent of ultra fines.

As any one of these factors increases so must the depth of the fuel bed increase. In many instances a depth of fuel bed 1½ to 2 times the width of the retort has been found beneficial. Some experimenting may be required to determine the proper depth of fuel bed in a given installation. If the fire appears ragged because of crevices between irregular pieces of coke a deeper fuel will improve the fire.

What Is the "Fuel Bed"

The fuel bed is the combustible material. It ranges from fresh coal to coke that is nearly burned up. The fact that the top of the fire is several inches above the retort does not mean that the *effective* depth of the fuel bed is the distance down to the retort. There may be considerable refuse, below the top of the fire. The loose ash and clinkers in figures 2 and 3 are not excessive. The clinkers illustrated are 3 to 4 inches high.

We will now consider how a deep fuel bed helps attain more efficient distribution of air from the fan. Figure 4 illustrates air passing from A through the tuyeres and blowing into the

Fig. 4—A good, efficient, economical fire. Arrows indicate the course of incoming air. Note that a "wide" fire tends to prevent "blow-holes" on the outer edges.

fuel bed as at B. The pieces of coal in the retort deflect the air in many directions, as toward C and E.

A short distance in from the casting, the air passages are tortuous because of the manner in which the pieces of coal pack together. Along the edge of the casting the air passages are more open. Therefore, there is less resistance to air flow along the edges of the fuel bed than in the center.

Air Flow Thru Bed Must Be Uniform

A thorough, even distribution of air promotes uniform burning and high efficiency. It reduces the amount of heat that is carried up the chimney by surplus air and lost to the outdoors. More will be said in a later article about heat losses to the chimney.

For more economical and satisfactory results, it is necessary that the fuel bed, along C to D, extend far enough beyond the edges of the retort to produce sufficient resistance to cause an ample supply of air to go through the center of the fuel bed, as from B to E and F. Increasing the fan

air blast will not accomplish this result. It can only be done by maintaining a fuel bed of good size. Desirable conditions can be obtained more regularly by using coal of small, evenly-sized pieces that is also free of excessive ultra-fines.

Fire Must Be Extended Laterally

To get sufficient resistance in the area C to D it is usually necessary to extend the bed of fire beyond the edge of the retort a distance of about three-fourths the retort width. For example, with a ten-inch retort, extend the fire about seven or eight inches beyond each side of the retort. A distance fifty per cent greater than this is often beneficial. If the fire box is not large enough to accommodate a width of fire described above, the fire should be carried much thicker in order that some of the surplus air many come into contact with fuel. In a later article, suggestions will be made relative to methods of operation with small fire boxes.

The diameter of the most economical fire is affected by five factors:

1. Air pressure
2. Width or diameter of retort
3. Size of coal
4. Per cent of ultra-fines, whether the fines were in the coal before put into the hopper or were made by crushing in the screw
5. Rate of burning.

As any one of the factors increases, so should the width of the fuel bed increase.

With a comparatively thin fire (Figure 5) air from A′ passes through the tuyeres blowing against the coal, as at B′, and is deflected toward C′ and E′. The resistance along the path B′-D′ is very low, permitting a large portion of the air to take this path. Because of the abundant air supply, coal along the path C′-D′ will burn away rapidly and an open channel will be formed on the under side of the fire. Then still larger quantities of air will rush up this easy path and seriously reduce efficiency, because only a small portion of the large volume of air following this path will come into contact with fuel and be used in combustion. Some of the fuel (that along the edges) will burn rapidly, giving the appearance of an intensely hot, active fire. The eyes do not see the quantities of excess air traveling this channel, picking up heat that is carried to the chimney and lost. Such loss can be, and often is, a large portion of the heat in the coal used.

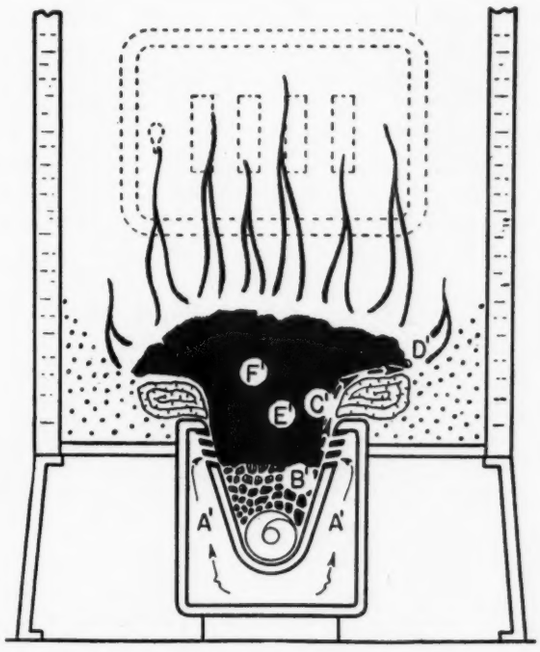


Fig. 5—A thin, heat-wasting fire. Note how air can blow past the edges of the fire and carry heat up the chimney. Central area may starve for air for combustion.

Air "Blast" Does Not Correct Thin Fire

The greater the quantity of air blowing out around the edges C′-D′, the smaller the quantity available to pass through the central part of the fuel bed, B′ to E′ and F′. Increasing the air blast does not correct this condition. Only by closing the open channels can air be directed through the fire. Breaking up the coke and trimming the fire will give temporary relief, but unless the fuel bed is deepened and widened, the same unwanted condition will again prevail in a short time.

With a thin, fast burning fire the coal is burned away on the outer edges as quickly as it reaches the path of the over-abundant air supply and the channel is kept open. This applies whether the fuel is fed from below or falls into the channel from above. At the same time fuel accumulates in the central part of the bed because of the air shortage there. The central portion is literally starving for air while the edges are wasting it. It is possible, in some cases, for the fuel on the outer edges to burn away fast enough to permit a column of coke several inches high to build up in the middle of the fire box.

Thin fires, with conditions such as those mentioned in this article, produce poor heating results in proportion to the amount of coal used. The correction is to break up the coke mass, and to adjust the coal feed and air supply so that the fuel bed will become deeper and wider. Usually this requires reducing the air supply and often necessitates increasing the coal feed. "If at first you don't succeed, try, try again." When a good balance between coal feed and air supply is obtained, the results will be efficient heating.

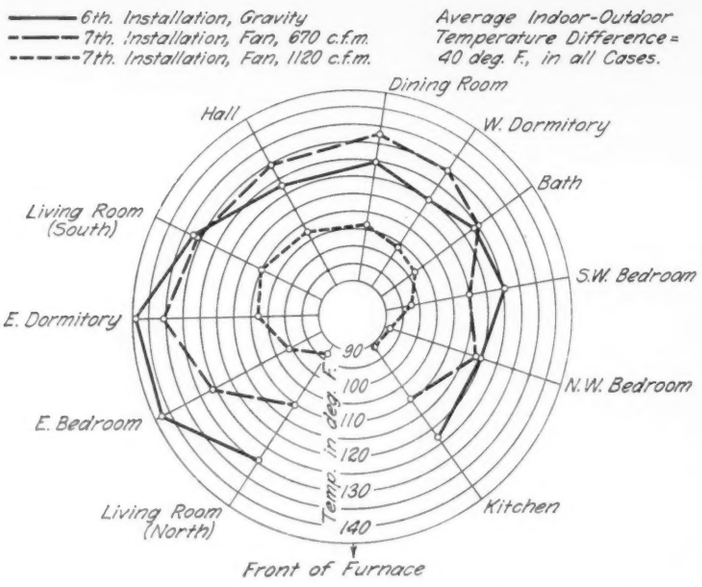


FIG. 27. TEMPERATURE DISTRIBUTION FOR AIR IN FURNACE BONNET IN SIXTH AND SEVENTH INSTALLATIONS

Left—Chart from Bulletin 246, Engineering Experiment Station, University of Illinois, showing bonnet temperatures for a gravity and a centrifugal fan installation. Note 25 degree differential on gravity and 25 degree differential on the 670 cfm fan system.

Casing baffling is the answer to—

Uneven Bonnet Temperatures Make Temperature Balance Difficult

By William Ayers

Evanston, Illinois

A NUMBER of articles have been published in the ARTISAN and other heating magazines dealing with the design of forced warm air duct systems. Some of these articles have been very technical and accurate. Others have been short-cut methods and quite simple to understand. No doubt many readers have used these different methods, or have used methods that have been taught them in engineering schools with varying degrees of success.

But in spite of efforts to standardize and to eliminate all causes of variation in results, most contractors find considerable variation in heating results in the different homes, even using the same type of furnace and the same design of duct fittings.

In the experience of the writer most of the problems arise at the plenum chamber. All of the formulas for designing duct work are based on a uniform bonnet temperature at all points. In other words, looking at Fig. 1 (which is looking down on the plenum chamber), at the entrance to trunk (a) the air is 165 degrees and at the entrance to trunk (b) the air temperature is 265 degrees and at the entrance to trunk (c) is 95 degrees. This variation in temperatures may seem exaggerated. But Fig. 27 from a U. of I. bulletin 246 shows 25 degrees variation in a really *good* gravity plant. Further, if readers will check some of their jobs they will find variations even

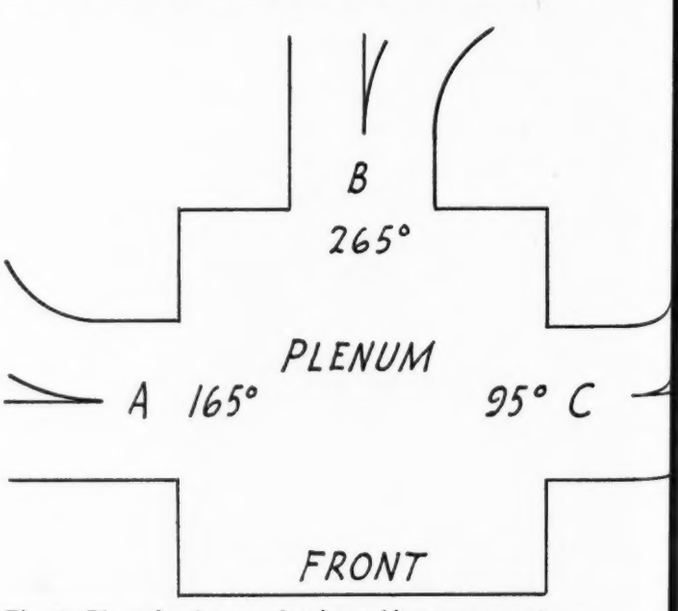
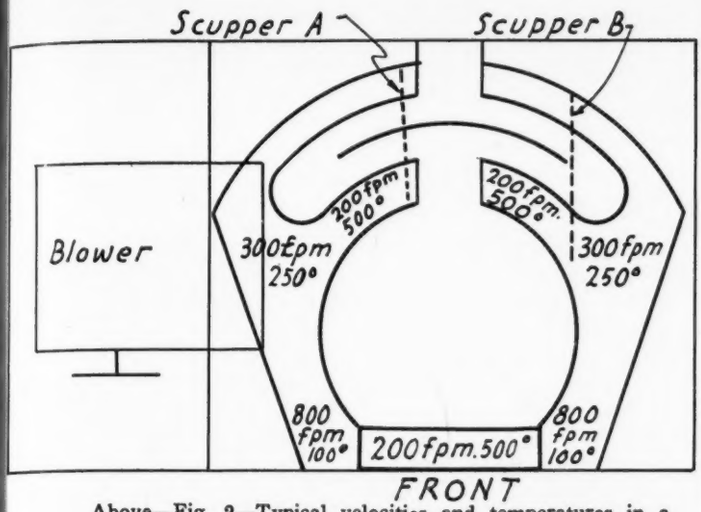
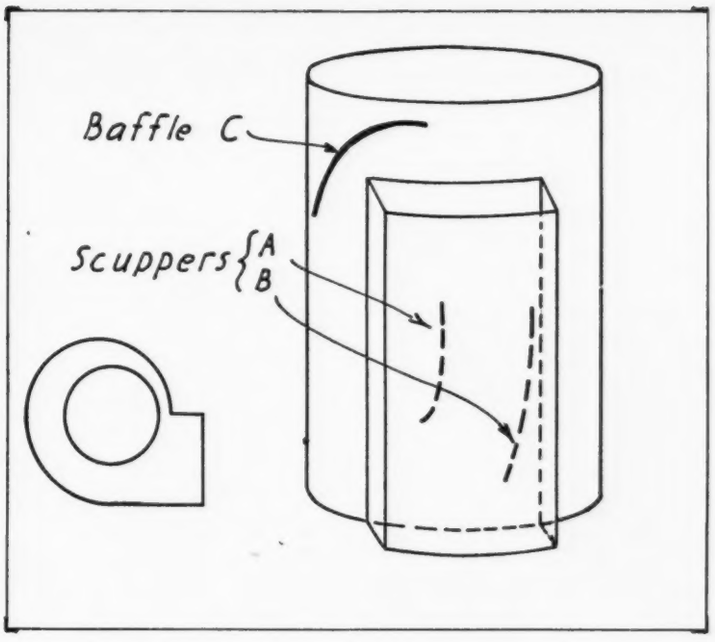


Fig. 1—Plan of a bonnet showing arbitrary temperatures (not an actual furnace) but not beyond the differences often encountered.





Above—Fig. 2—Typical velocities and temperatures in a steel furnace. For left side blower application two baffles as shown will aid in evening out both cfm's and temperatures. Right—Fig. 3—Elevation of Fig. 2 showing three baffles designed to eliminate "hot spots" and even up air flow. "C" deflects air across the pouch; "A" and "B" control air going by radiator.

greater than this. Remember that the air returns to the furnace at about 65 deg., the variation between the amount of heat delivered by these ducts varies in an even greater proportion than is apparent at first glance.

In other words, there can be a 100 degree difference between the supply and the return air from duct (a); there can be a 200 degree difference between the supplied air of duct (b) and the returned air, and there can be a 30 degree difference between the supplied air of duct (c) and the returned air.

Bonnet Temperatures Affect Register Temperatures

The result of this temperature variation is alarming. For example, say that calculations require a duct area of 40 square inches to a certain room. If the duct comes off of the side marked (a) the room should be accurately heated. If the duct comes off of (b) the room will receive two times as much heat and be too hot, while if it comes off of duct (c) there will be only one-third the heat and a cold room.

Going a little further, imagine the results if the thermostat is located in any of these rooms. If it is located in a room off of (a), the rooms being supplied by (b) will be too hot, and the rooms being supplied by (c) will be cold. If the thermostat is in a room supplied by (b), the other rooms on that trunk will be properly heated and those in (a) and (c) will be cold. If the thermostat is located in a room supplied by trunk (c), the other rooms supplied by (c) will be properly heated and the rest of the house supplied by (a) and (b) will be greatly overheated.

Now let us consider the result of placing controls in either of these areas. If the elements of the fan control are in the 165 degree zone, there will be a great deal of gravity action at trunk line (b) before the fan control starts operatng. There may even be a reverse flow at that time in the (c) trunk line. If the fan control is located in the 265 degree zone, the blower will come on and blow cold air through ducts (a) and (c) and the rooms at (b) will be satisfied before warm air has even started to flow through the other two ducts. If the fan control is located in the 95 degree zone, the temperatures at the other two points will get excedingly high and there will be the possibility of a great deal of gravity action occurring through ducts (a) and (b) before the fan turns on. In some cases the fan has never come on because the limit control, which was located in the high temperature area, shut off the furnace before the fan had a chance to operate.

Plenums Don't Always "Mix" Air

From this it is evident that all the formulas for duct design must assume a fairly uniform bonnet temperature, and if this link in the chain of a duct installation is faulty, the operation of the heating system will be unsatisfactory. Someone may say that the plenum is designed to mix the air so that you do not get this condition. That is the theory of the plenum, but with air traveling at an average velocity of 600 feet a minute through the casing, the air does not always stir itself up and mix to a uniform temperature. The air has a tendency to cut high velocity paths through the casing. This is best illustrated by watching water in a stream. There are eddying currents set up where there are changes of direction, but the water in the eddying currents has a tendency to remain there and be passed by the water which has retained its velocity.

It is well at this point to remember one thing —that air definitely has weight and requires energy to get in motion, and requires energy to change its course after it is in motion. Although

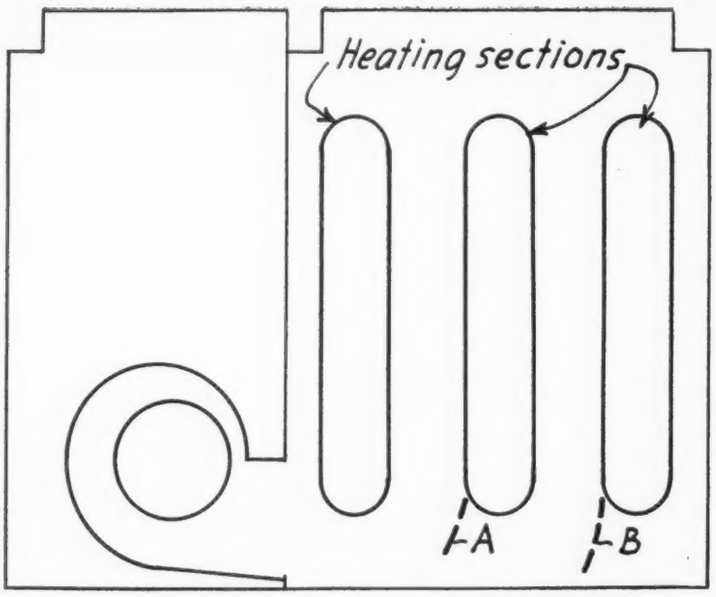


Fig. 4—Elevation of a sectional furnace with baffles "A" and "B" which equalize air flow through section passages.

you have a static pressure in the ducts or casing, the velocities and pressure are not the same at all points in the system and casing.

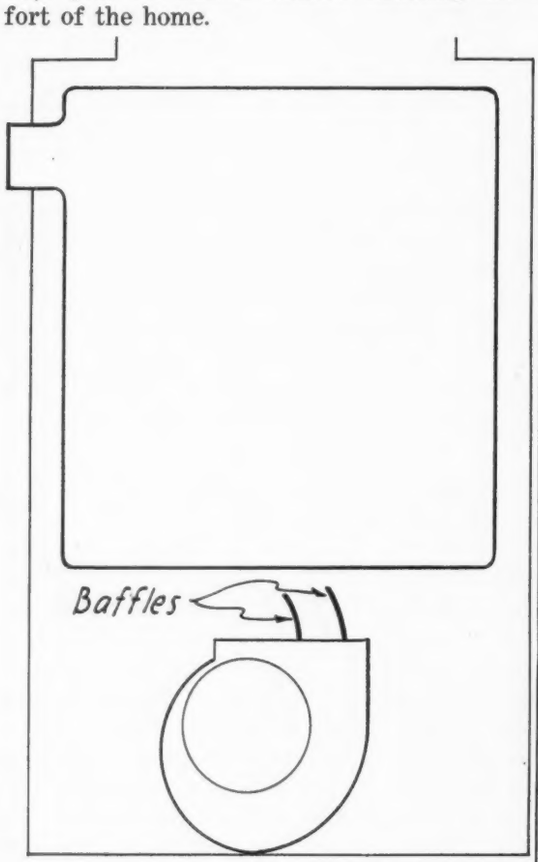
The problem, then, is to get uniform air distribution through the casing in order to obtain uniform temperatures around the bonnet. All corrections, of course, should be the simplest and least expensive means of correcting existing evils so that the systems will perform satisfactorily. We can, however, have a variation of as much as 10% plus or minus without affecting the comfort of the home.

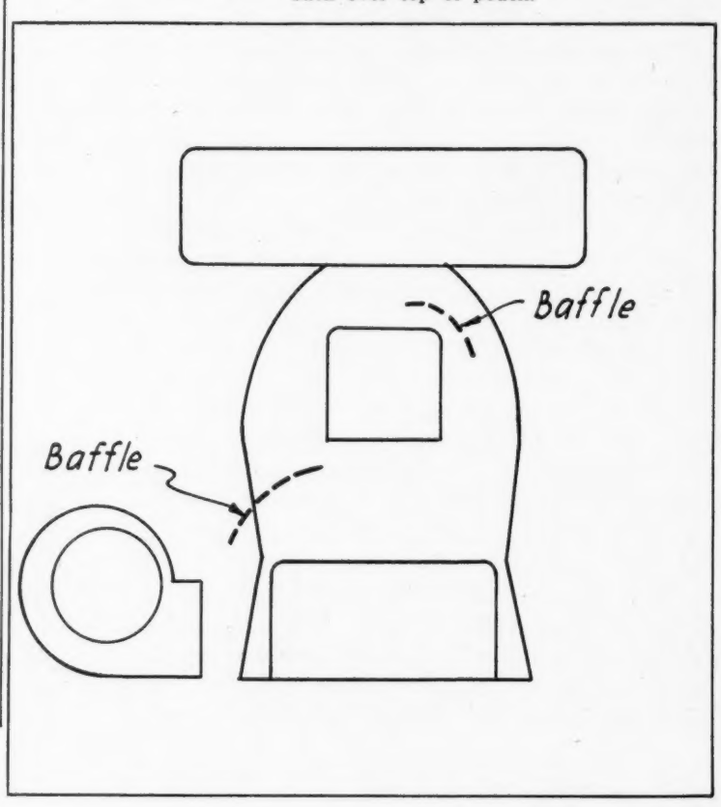
Taking first the conventional steel furnace with the kidney shaped radiator at the back; in Fig. 2, looking down at the furnace from the top, we find a variation in temperatures and velocities of 800 feet a minute and 100 degrees to 200 feet a minute and 500 degrees. Notice that the greatest amount of air is going through certain areas of the furnace and doing the least amount of work in the hottest part of the furnace. There is no sense in handling air unless it is going to wipe the heat off the hottest surface of the furnace. At the point where the most heat is available there is very little air moving to pick it up. Consequently, if the furnace casing were transparent so that you could see these spots, you would find they are red hot and in some cases have a tendency to buckle at that point.

This can be corrected by placing a scupper at (a), which will catch some of the air from the blower going around the radiator. The length of this scupper is determined by how close to the floor of the casing you must go to catch enough air, and is a matter of trial. Also, place another scupper at (b), this being longer than (a) and extending closer to the furnace floor to catch the air that was not caught by scupper (a). This will cut down the velocity at the right hand side of the furnace pouch away from the blower and will also raise the temperature at that point. To make use of the velocity at the left hand side or blower side of the pouch, place baffle (c) as shown

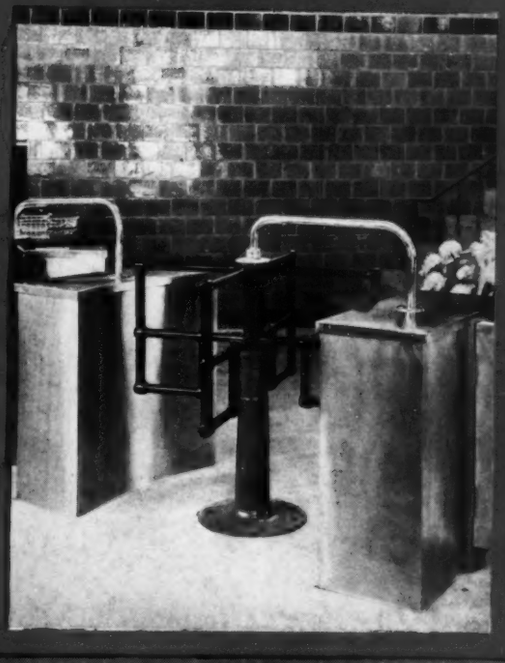
(*Continued on page* 114)

Left—Fig. 5—Baffles in an upright placed at blower outlet to equalize air flow at outlet. Usually more air leaves the blower along bottom of outlet than along top. Right—Fig. 6—Baffle to throw air between ashpit and feed pouch and back over top of pouch.





SHEET METAL SECTION



DEVOTED TO SHEET METAL CONTRACTING AND FABRICATING

A GALVANIZED SHEET WITH

IMPROVED WORKABILITY AND COATING

This sheet is worthy of the name SUPERIOR. It possesses a high degree of workability and its ability to withstand forming operations without flaking or peeling goes far beyond that of ordinary galvanized sheets. It's a sheet that solders well, handles well and possesses a high degree of uniformity. You'll like the uniform bright spangles of these and other SUPERIOR sheets. Their "clear through" quality can help you do easier, faster work and make satisfied customers.

The Superior Sheet Steel Co.
Canton, Ohio
Division of Continental Steel Corp.

SUPERIOR

CONTINENTAL STEEL CORPORATION

Uses and Limitations of Radiant Heat For Baking Organic Finishes*

By G. KLinkenstein
Vice-President and General Manager
Maas & Waldstein Company

THE first commercial application of the infra-red baking process was developed in the works of the Ford Motor Company about eight years ago. This company controls patents covering this process and permits their use without restrictions. This liberal attitude deserves the gratitude of everyone in the industrial finishing business. For several years, the use of infra-red baking was almost entirely restricted to automobile finishing, but because the process of baking organic finishes by means of short infra-red rays was found to be highly economical for other kinds of work, its use spread widely in the industrial finishing field during the last year.

As is often the case with new developments, the special advantages and limitations of this process were not at first fully understood. As a result, some of its applications proved unsatisfactory.

Similar errors need no longer be made. We now know enough about infra-red baking to evaluate its possibilities correctly and to avoid applying it where its use will not be profitable.

Infra-Red Equipment

Infra-red heat is commonly supplied by electric lamps, but there are other sources of infra-red radiation. Vitreous grilles, heated to incandescence by gas flames, are used for certain baking operations, but such heaters are not suitable for baking organic finishes because of the fire hazards involved.

The infra-red lamps are usually arranged to form tunnels through which the products to be baked are carried by conveyor systems, but portable banks of lamps are used to bake finishes on products too bulky to be handled by conveyors, and individual portable lamps are used for touch-up work.

The rays that do most of the work of baking in the infra-red process are those that lie close to the visible red rays in the spectrum. Strictly speaking, the term "near infra-red" should be applied to these rays to distinguish them from the "far infra-red" rays given off by the sources of heat used in convection ovens. As no real confusion results however, the simpler term "infra-red" has come into general use. The term "infra-red" heat is now being commonly replaced by the more descriptive term, "radiant heat," which will be used throughout this paper.

Explanation of Radiant Heat Action

Organic finishes are baked by means of radiant heat when they are exposed to the rays emitted by specially designed electric lamps, equipped with reflectors to localize the radiation at the finished surfaces. These lamps are mounted on a skeleton framework to make easy adjustment or focusing of the radiant-heat rays.

When these rays strike a freshly applied finish, the finish film becomes hot and its temperature is raised to the baking temperature within one or two minutes. This is in strong contrast with the action that takes place in the ordinary convection type of oven, where first the air must be heated, and then the entire mass of the products on which a finish is being baked gradually absorbs the heat until baking temperature is reached. It may be fifteen or twenty minutes before the mass of products and the hot air in the oven reach equilibrium.

Speaking in physical terms, the visible light rays from violet to red, have wave-lengths lying between 4000 and 7800 Angstrom units; those we are calling the infra-red rays have wave-lengths between 7800 and 14,000 Angstrom units; and the far-red rays have wave-lengths running up to 120,000 Angstrom units.

Varieties of Infra-Red Rays

Radiant-heat baking is not necessarily limited to the infra-red rays. Certain types of lamps, using enclosed reflectors, utilize a band ranging from 7500 to 30,000 Angstrom units.

Radiation lying on the other side of the visible spectrum may also in time play a part in the treatment of organic finishes. John Sanderson,

**Address at Annual Convention, American Electroplaters' Society, June 11, 1941, and published in Metal Finishing, Organic Finishing Section.*

of the American Cyanamid & Chemical Corporation, has published the results of experiments indicating that ultra-violet radiation may also be useful in accelerating the hardening of certain types of finishes. If further research shows that this work has a practical side, the organic finisher may find use for other radiating devices. However, this further development lies well within the future.

It is fair to say that most industrial finishers believe that the radiant heat rays possess special properties and that the radiant-heat baking process differs in principle from the process of baking in an ordinary convection oven. Specifically, it is commonly held that, in a convection oven, the finish is baked from the outside inwards, whereas, with radiant heat baking, the rays pass through the coat of finish, heat the underlying material, and thus bake the finish from the inside outwards.

This idea is not correct. As a matter of fact, the radiant heat process is generally used for baking opaque finishes which the rays can not penetrate. We are, therefore, dealing, not with a new kind of heat, but merely with a new and very rapid method of applying heat.

In other words, the radiant heat process is just one more form of baking. It provides the industrial finisher with another tool but not one of unlimited usefulness. It gives excellent results with certain kinds of work, but it is inefficient as compared with the convection oven for other applications, and, for some important purposes it is useless. It is by no means going to supersede the convection oven completely.

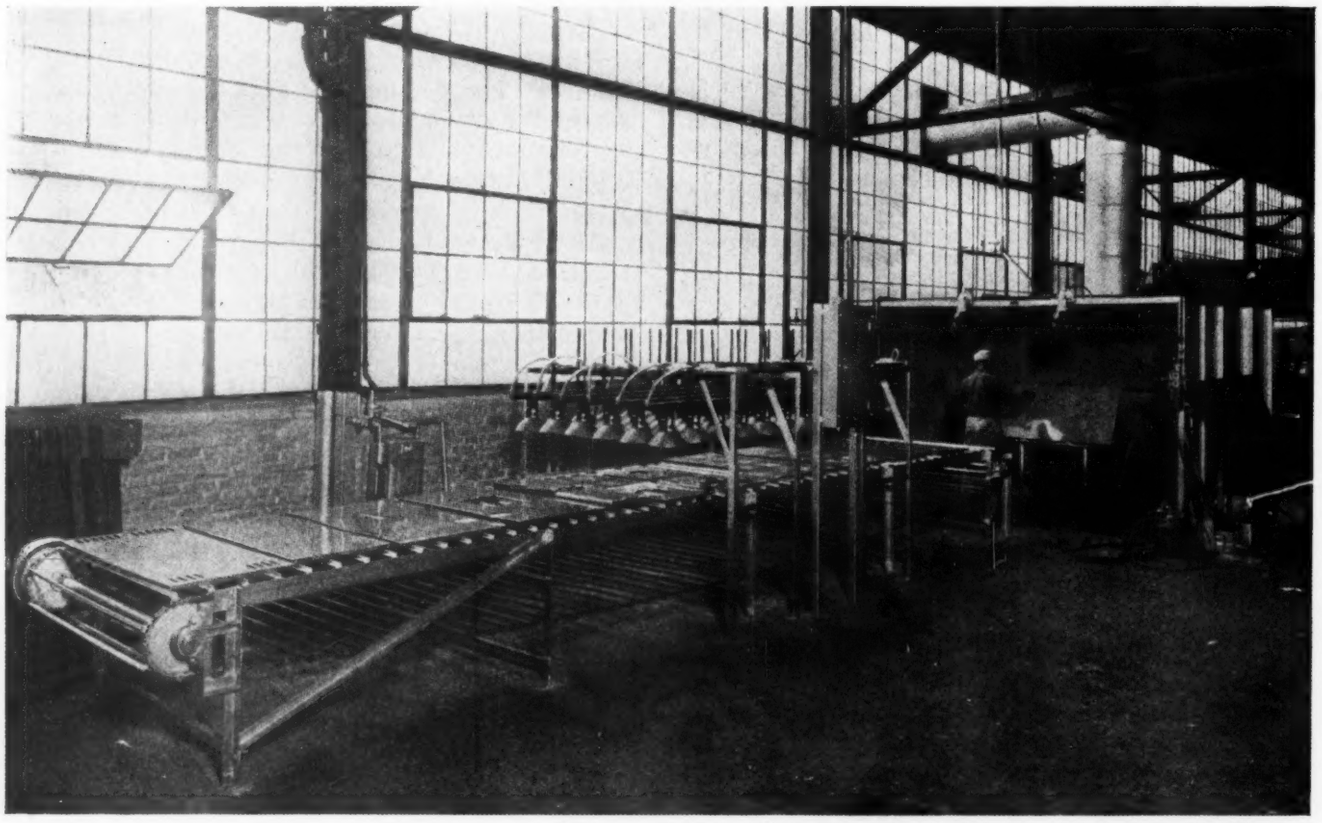
As practical finishers, we are chiefly concerned with ascertaining under what conditions radiant heat baking should and should not be used. Let us give this subject careful consideration.

Conditions for the Efficient Use of Radiant Heat Baking

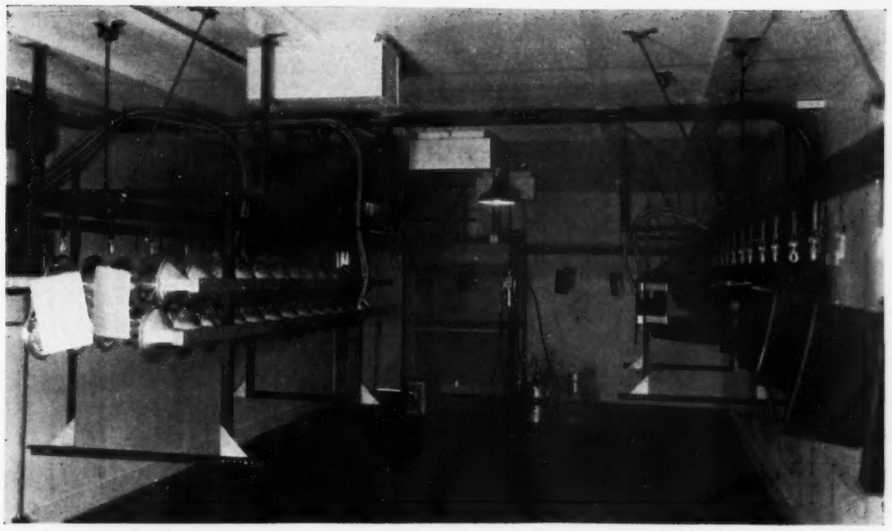
The cost of electric current must be low.—Comparative cost studies indicate that radiant heat baking cannot ordinarily compete on an energy cost with baking by oil or gas heat unless the electric current can be purchased for 1¼c per kilowatt-hour, or less. In certain cases, however, some of the special advantages of radiant heat baking may out-weigh higher operating costs.

The heating equipment must be specifically designed for the work it is to do.—In order to produce a satisfactory finish and to keep operating expenses low, a radiant heat baking installation must be designed for the particular product and the particular finish it is to handle.

For a well-baked finish, the entire coating must be heated evenly to the required temperature. This is accomplished by locating the lamps so that they irridiate all finished areas on the product



Single, top panel bank of infra-red lamps designed to bake small, flat pieces finished on one side only. Installation is in the plant of the Anchor Post Fence Co., Baltimore.



Parallel banks of infra red lamps in plant of Gale Products, Galesburg, Ill. Designed to bake small, irregular pieces, usually finished on outside only.

uniformly from an accurately determined distance.

With products of simple form, such as sheets, rectangles, and cylinders, it is an easy matter to arrange the lamps in the proper manner, but when the product is irregular in shape, a complicated set-up may be required in order to avoid the formation of hot or cold spots. With very irregular products, such as those with knobs or deep recesses, it may be impossible to use radiant heat baking.

The radiant energy must be used efficiently.—Efficient operation is important because, even with cheap electricity, the electric lamp is an expensive source of heat, and if much of the energy it radiates is wasted, the cost of current may become prohibitive.

The energy emitted by the lamps may be wasted in the following ways:

The radiation may not strike the work.

It may be reflected from the surface of the work.

It may be carried away, through convection, by air currents.

It may be re-radiated from the work when the latter reaches an elevated temperature.

To keep these losses at a minimum, the heating installation must be carefully planned, with every factor affecting current consumption taken into consideration.

Radiant heat baking is best suited to the quantity production of similar products.—When a radiant heat oven using open reflectors is set up to bake a given product, it cannot handle products that differ greatly in size or shape. A cylindrical oven has more lattitude in this respect, but the variety of products that can be baked in it is not unlimited.

The oven can be re-arranged at any time to fit the requirements of another product, but such changes require careful study on the part of experienced men and can not be made frequently without delaying production and greatly increasing costs.

In consequence, radiant heat baking using open reflectors is not suitable for the use of manufacturers who must bake many different kinds of products at the same time or are constantly changing the character of their output. It is essentially a tool for use in the mass production of single, or similar, products.

Metal products usually can be baked by the radiant heat process.—Wood products can be baked in radiant heat ovens, but unless the greatest care is taken, bubbling or pin-holing will occur, due to the gases and moisture contained in the cells of the material. For all practical purposes, the use of radiant heat baking has been confined to metal products.

The finish used must be suitable for radiant heat baking.—Only those finishes which are hardened solely by the application of heat can be baked efficiently in radiant heat ovens. Fortunately, these "heat-reactive" finishes are the ones favored for use in high-speed mass production so that they suit the usual applications of the process.

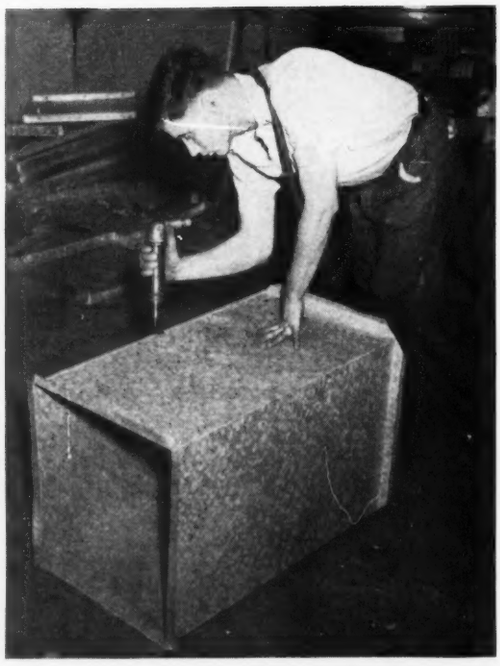
Radiant heat baking is inefficient as compared with convection-oven baking when used for finishes that must be baked for a long period of time, such as the finishes that harden by oxidation and the japans.

It is also inefficient for baking clear finishes on polished metal surfaces because a large percentage of the radiation is wasted by reflection. But when the clear finish is applied over a non-reflecting surface or a pigmented undercoat, this difficulty is not as serious.

The heat from the infra-red lamps tends to slightly "char," or turn yellow, certain types of finishes, so that these must be avoided when the process is used.

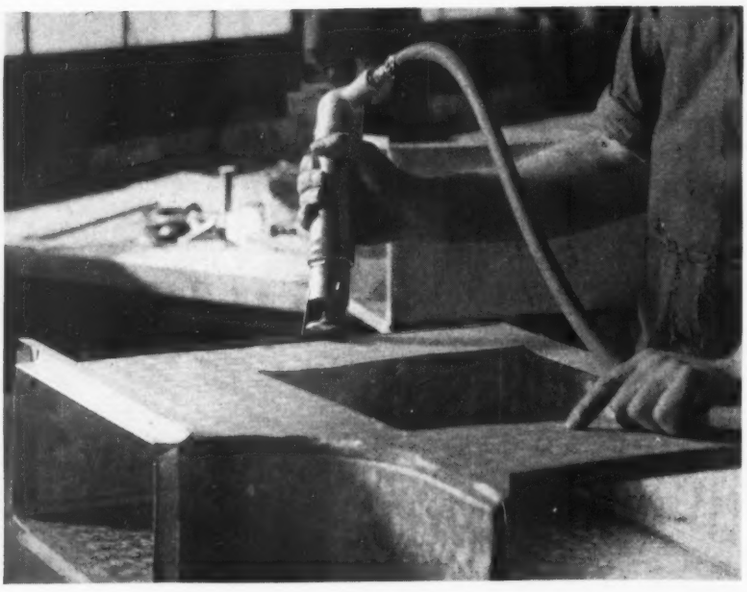
On the other hand, certain enamels, that when baked in convection ovens, are apt to wrinkle on fatty edges or when applied too heavily, are baked without trouble in radiant heat ovens.

(*Continued on page* 116)



Left—Original photograph shown in January issue. Note that section is placed on floor; the side is stiff enough to provide a working surface (no rail needed). For closeups, see below.

Below — Closeups of the hammer closing a Pittsburgh lock. Note guard which is pressed against side of duct to guide hammer along the seam and keep hammer from jumping off the metal.

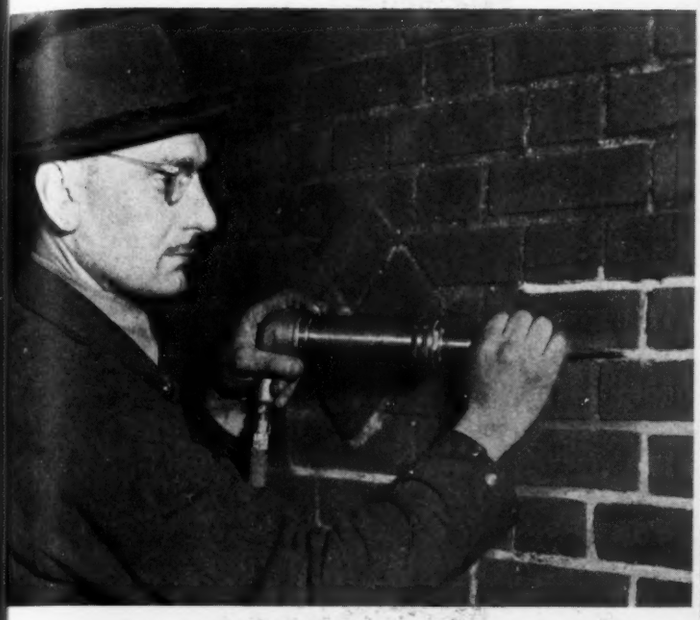


Here's That Hammer Again

ON the cover of the Sheet Metal Section of the January, 1941, issue, a photograph showed a mechanic in the shop of the Blattmann-Weeser Sheet Metal Works, New Orleans, closing a Pittsburgh seam by means of a small hammer. Numerous letters were received asking the name of the hammer and how it operated. It develops that the hammer is a very handy tool and possesses numerous other use possibilities. These uses are described by Werner Blattmann, Superintendent of the firm, as follows:

"On returning from 18 months travel in Europe during which time I visited many factories and shops, particularly those engaged in the sheet metal industry, and being constantly on the alert for new tools and methods to improve the efficiency of our shop, I discovered in New York a tool which I consider most useful to the sheet metal trade, a utility tool for every sheet metal shop.

"It is the Appton Super Air Hammer, which operates on a one H. P., compressor unit, can be plugged into a regular 110 volt socket, is mounted on rubber rollers, can easily be carried by two men, fits in the luggage compartment of a car. Among its numerous uses, this air hammer is particularly adapted for closing or turning down Pittsburgh locks on gauges from 29 through 18. The duct and fittings still have to be tacked to-



Above—The hammer will cut 50 feet of reglet per hour, 1 inch deep. Right—For expansion bolt holes, the hammer with star drill will make a 1-inch hole, 2½ inches deep, in 62 seconds, in ordinary concrete.

◆

gether by hand; however, one air hammer can keep at least five men busy tacking. Its efficiency increases with the size of fittings, ducts, and the gauge of the material as well as the quantity.

"Following are listed some of the numerous uses we have found in our own shop:

"Closing the Pittsburgh Lock—

"Including 29 through 18 gauge, average 80 feet per minute 22 gauge.

"Cutting Reglet in Walls—

"For counter flashing, etc., with ¼ inch Cape chisel, 1 inch deep; in brick wall 50 feet per hour; in concrete wall 20 feet per hour.

"Drilling in Concrete—

"From 5/32 inch to 1 inch diameter holes. Bluestone concrete 1 inch diameter hole, 2½ inch deep in 62 seconds. Easily possible to drill marble without flaking the edge of hole.

"Breaking Holes in Concrete, Brick, etc.—

"With bull point.

"Chipping Slag from Electrical Welds—

"Riveting—

"Up to 6 pound rivets.

"Cutting Mild Steel—

"With chisel in strips ⅛ x ¼ inch smooth as a lathe.

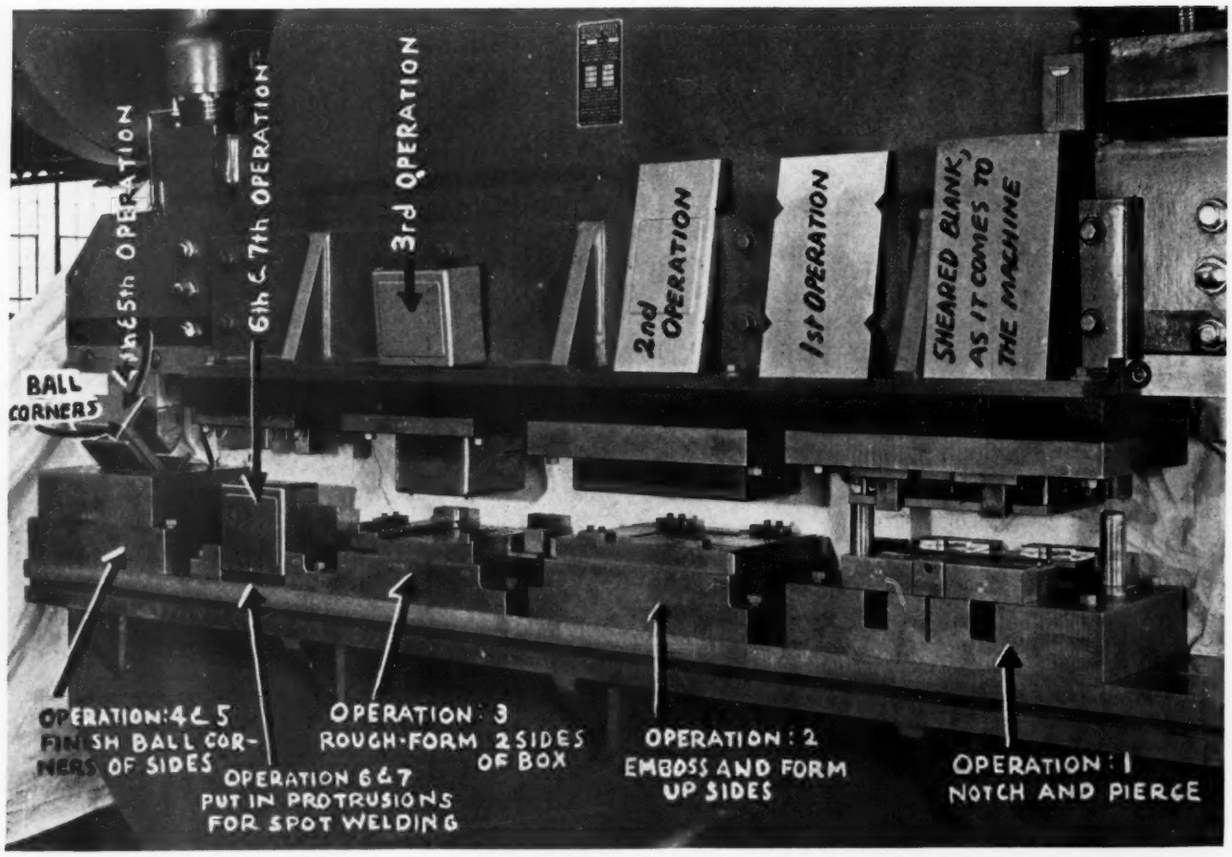
"Cutting Openings in Ducts for Outlets—

"After assembly of same.

"We now have two of these air hammers constantly in operation."

Correction on Phosphate Treated Sheets

W. A. Jahn, Milcor Steel Company, Milwaukee, calls our attention to the foot note explanation of Phosphate Treated sheets on page 39 of the October ARTISAN and states that his understanding of this term is: "Your definition of 'Phosphate treating' is correct, but phosphate treating in the case of order No. P-55 refers to treating black sheets only and does not refer to galvanized. I am afraid your readers in this case got the wrong idea. Galvanized sheets, except under very special consideration and galvanized eaves trough and conductor pipe, galvanized forced air heating ducts, elbows, etc. are specifically eliminated in order No. P-55. The only exceptions to this are along the seaboard, the gulf and a few places within a radius of 30 miles of Lake Michigan. I thought I would call this to your attention."


4th & 5th OPERATION
6th & 7th OPERATION
3rd OPERATION
2nd OPERATION
1st OPERATION
SHEARED BLANK, AS IT COMES TO THE MACHINE
BALL CORNERS
OPERATION: 4 & 5 FINISH BALL CORNERS OF SIDES
OPERATION 6 & 7 PUT IN PROTRUSIONS FOR SPOT WELDING
OPERATION: 3 ROUGH-FORM 2 SIDES OF BOX
OPERATION: 2 EMBOSS AND FORM UP SIDES
OPERATION: 1 NOTCH AND PIERCE

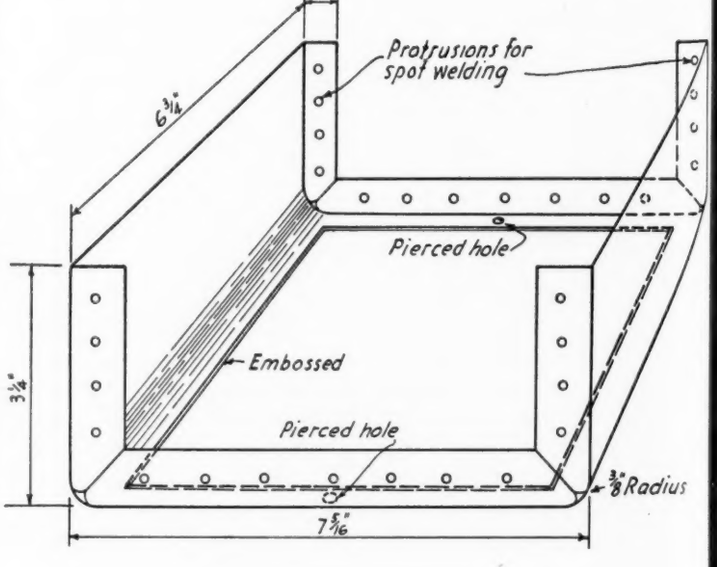
The photograph facing shows the press with dies placed to make the seven operations. The photograph above shows the die groups with sequence of operations indicated. A sketch of the box appears below.

Seven Die Set-ups to

Form a Small Sheet Steel Box

NECESSITY under war requirements has stimulated the use of available tools, with sometimes surprising economy. The accompanying illustrations show how a manufacturer met a production problem when his raw materials for zinc castings was cut off and, to further complicate the problem, the manufacturers could not get draw steel, and the stock he had available had a rather wide commercial variation in gauge thickness. Not so readily shown, is the fact that the new method proved a considerable economy. The small sheet steel box was designed, dies and machinery made, and the set-up was in operation within 60 days.

The first operation was to notch and pierce the piece—the second, to emboss the forward face of the box and turn up the flanges. Three more progressive steps completed the piece, together with protrusions for welding on the side walls of the box, which was the final operation. Safety devices were later fitted to the press, which with one operator produced 35 to 40 boxes per hour

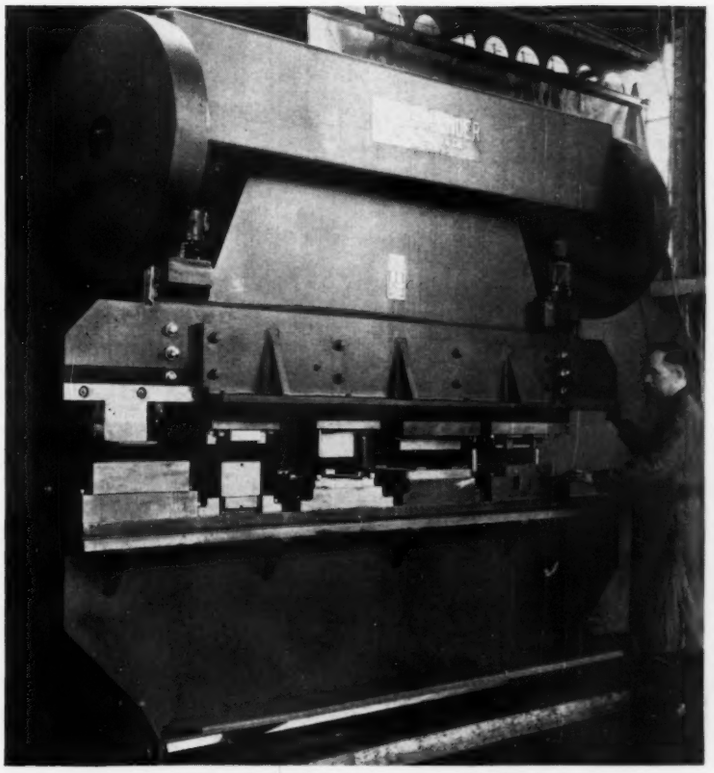


in tryout.

The box is completely formed up and all that is necessary is to spot weld on the two sides. The most difficult part of the job was the ball corner, as this had to be seamed tightly enough to be dust proof.

The advantages claimed for this set-up are—first, it avoided the need of special drawing steel, —second, the box was completed in the hands of one operator without being put down or conveyed to another press, with a marked saving in handling time. Third, the floor space requirements were less than if the job had been done on a number of separate tools and, fourth, the cost of operating one press with a 5 HP motor is materially lower than if the work were done on a series of presses with individual mechanisms, all requiring attention. A fifth advantage from the manufacturer's standpoint was that the dies for this process were less costly than draw dies, and that the bending press itself is a type of tool having a wide usefulness for other types of work.

The bending press shown in the picture is a Model B-6 Sturdybender, manufactured by Cyril Bath & Company, Cleveland, Ohio, who likewise furnished the design and dies to complete the job.



Sub-Contracting Relieves Community Unemployment

The office of Production Management has certified to the War Department that Meadville, Pa., faces severe unemployment because of shortage of copper alloy for slide fasteners by Talon, Inc.

For a number of years this firm has provided approximately 55 percent of the total manufacturing employment in the community and in July 1941 salaries and wages paid to its 5,219 Meadville employes represented approximately 68 percent of all factory pay rolls there.

The company has already been forced to lay off 841 men in August and further curtailment of its employment will have a most serious effect in the community.

Noting that Talon's workers are of a high caliber and capable of being trained for other than their normal work, the OPM recommended a remedial program that includes the negotiation of contracts for gages, fixtures, jigs, and small parts of other articles needed for defense purposes.

The War Department has also placed an additional defense contract in the Kenosha-Racine area of Wisconsin after certification by OPM that the area is faced with severe unemployment due to shortages of material for nondefense production.

The Quartermaster Corps awarded the Nash-Kelvinator Co. a contract for 1,028 one-ton cargo trailers at a cost of approximately $225,000. Production is to begin immediately.

Investigation has also established that Evansville, Indiana, is threatened with serious "priorities unemployment."

Evansville has a population of 110,000 persons dependent on employment in the durable consumer goods industries, especially the manufacturer of refrigerators and automobiles. There are approximately 21,000 industrial workers in the Evansville labor market, of whom 3,000 are now unemployed.

Of the 18,000 employed industrial wage earners at least half are in plants which have been or will be affected by required curtailment of nondefense production or shortages of material for nondefense work. Twenty-two plants investigated in July had an aggregate employment of 10,953 wage earners, of whom only 239 were engaged on defense contracts. Largely as a result of priorities, employment in these concerns dropped to 9,766 wage earners by September, with 427 on defense work, a net displacement of nearly 1,200.

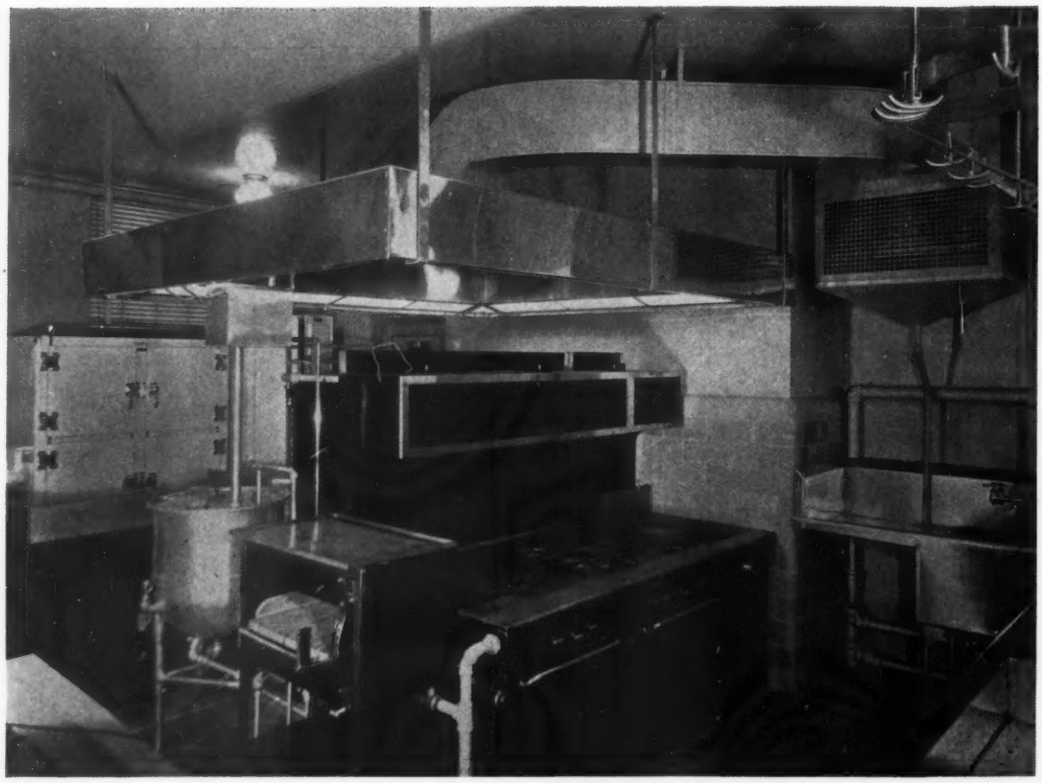
The companies estimated that they would provide employment for only 7,815 wage earners in January, 1942. This would represent a direct displacement of over 3,000 wage earners, not including salaried employees.

Four large concerns account for 2,300 of the employes displaced or threatened. These companies are Servel, Inc., and Sunbeam Electric Manufacturing Co., makers of refrigerators; Briggs Industrial Corporation, makers of automobile bodies; and the Chrysler Corporation.

Remedial programs recommended for these and other affected companies in Evansville are, briefly, as follows:

Servel, Inc.: This company has made successful bids on cartridge cases, gun turrets, listening posts, and

(*Continued on page* 108)



Left and on facing page —Large stainless steel hood fabricated by Gichner, Inc., for a college kitchen. The plain, straight-forward treatment of the lustrous stainless surfaces enhances the appearance and needs no extraneous ornamentation. Note interesting hanging detail.

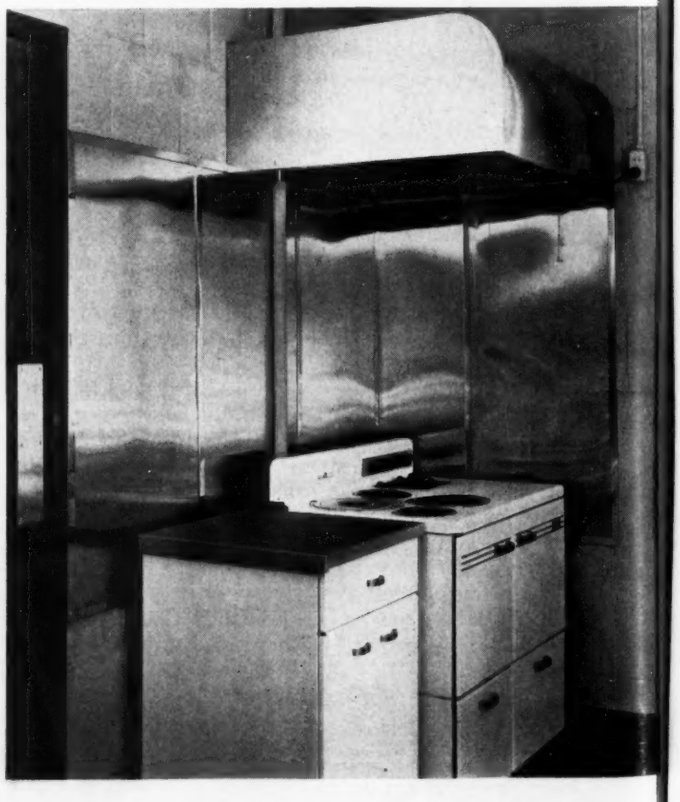
Below are shown (left) a stainless steel counter illustrating the author's contention that stainless shows best on smooth, curving contours and (right) small stainless hood and wall paneling.

"Do's" and "Dont's" For Stainless

By Lawrence E. Gichner
Gichner Inc., Washington, D. C.

AN infinite amount of adventure lies in stainless steel. Its possibilities for development are endless. It is the most interesting metal in the world today.

It lives. It sparkles. It's alive. Mount Olympus, home of the Gods, is probably trimmed



in stainless steel. It is as modern as the year 2000. It's the "Umph" in metals.

It is the medium through which we will see some great art expressed. With its highlights and shadows—its opportunities for intense contrast—its endurance—it is a perfect metal in which artists may express their emotions and ideas in permanent form.

But — momentarily — commercial work has claimed this great metal for its own. Cleanliness, sheen, durability and strength are its appealing characteristics.

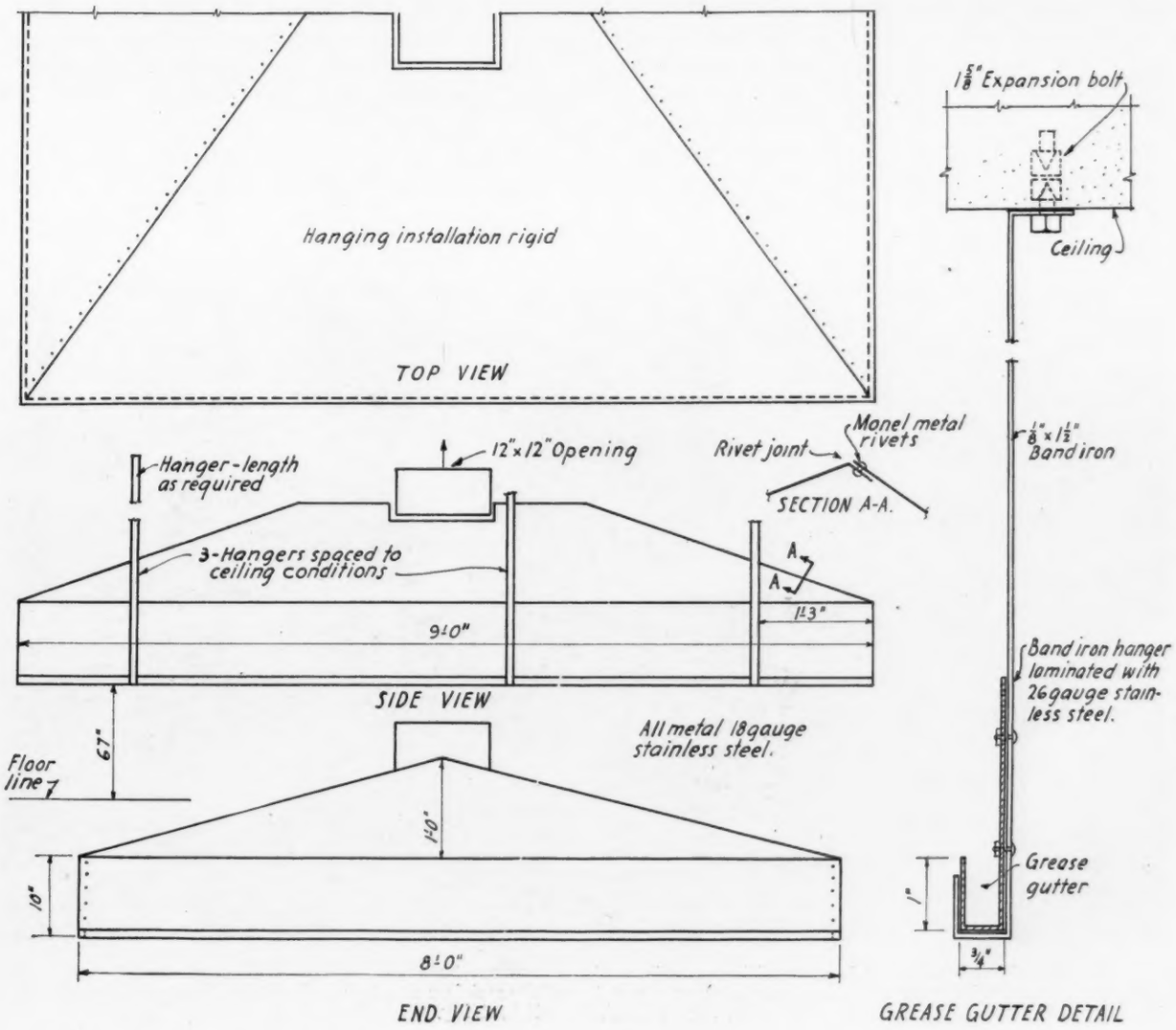
From small photographic trays to colossal transcontinental trains its popularity is sweeping America. In the hands of craftsmen the finished product is a joy to the eye. In the hands of the unskilled the result can be almost a nightmare. And yet the essential skills and secrets are easily learned. Some of the most difficult fabrications are possible with the average tools found in the average sheet metal shop. Only a few rules are essential.

The first of these rules is care—extreme care—in the case of those who can't do their own polishing after fabrication and work with the factory finished sheets. Drawn across the shears and pulled in and out of brake, the lustrous surface becomes easily scratched and marred.

Trying to successfully bend stainles steel on the general brake, battered by all kinds of work in a general sheet metal shop, is disastrous. The bending surfaces on the utility brake are hammer nicked and mallet scarred. With them it is impossible to do a perfect job. On galvanized iron these tiny imperfections are not discernible, but on stainless steel the blemishes are as conspicuous as a drop of blood on a white sheet. Invariably the bends are wrinkly, corrugated and unslightly.

Gichner, Inc., has overcome this hazard by providing one brake used solely for bending stainless steel. When not in use this brake is locked and a metal protection plate placed over the bending edge.

To have a special work bench just for stainless steel is ideal for those who can spare the room. For those who can't, the table that is used should



Above—Soldering a corner in a stainless steel pan. On short seams chill plates are not necessary. Right—On long soldered seams, chill plates on top and below carry away heat and minimize buckling.

Dressing down stainless steel soldered seams is done with several materials, but Gichner, Inc. has found that a German silver scraper is just tough enough to remove the solder and just soft enough to prevent scratching the stainless surface.

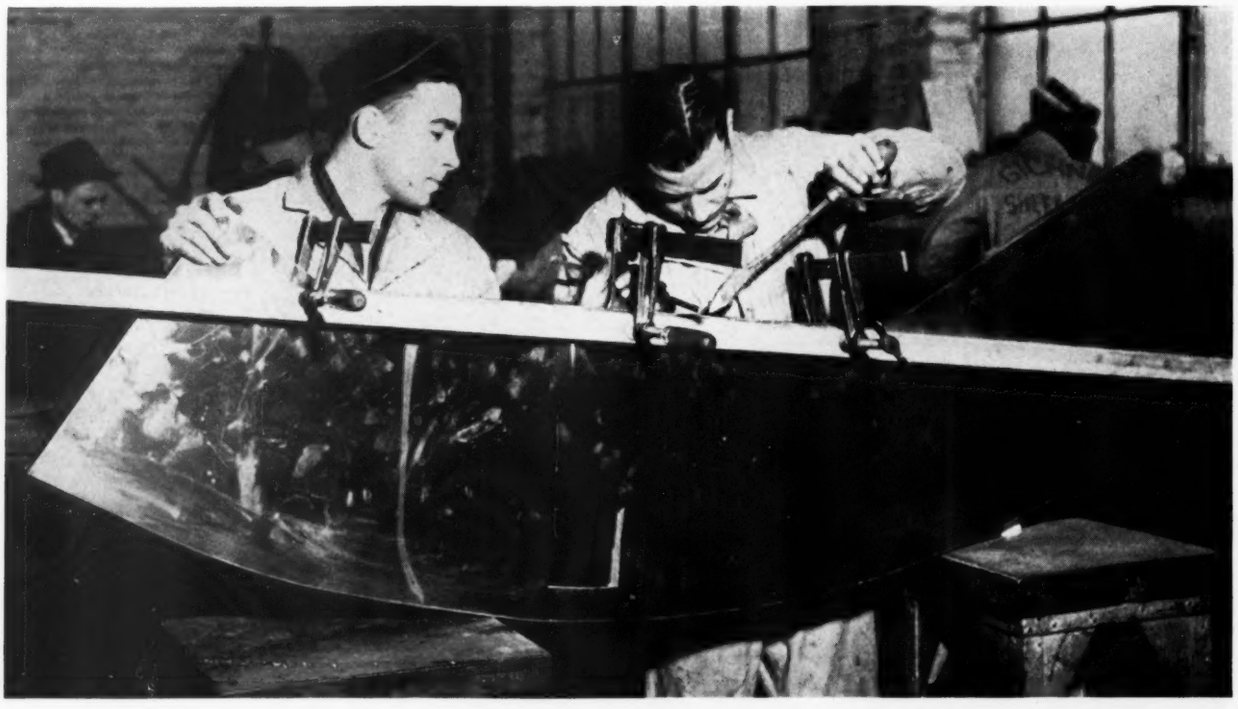
be carefully cleaned of all small slivers of iron that so ruinously damage the smooth surface when the sheet is drawn over them. Covering the bench with news and building paper helps protect the surface also.

Next to scratching the surface, the problem of satisfactorily soldering stainless steel seems to be widest spread. In our shop clamps have proven a big help in keeping the metal straight and free from buckles at seams where soldering is necessary. A board or angle iron with asbestos paper underneath is clamped on either side of the seam. Sufficient room is allowed for easy soldering. Brass is alright, but a piece of German silver is superior for removing the superfluous solder. The German silver is strong enough to shave the solder, but too soft to mar the stainless steel. With it, all unnecessary solder can be easily removed and one need not fear pressing or bearing down too hard.

The same cement used to lay linoleum or apply acoustical tile does an excellent job of laminating stainless steel to wood. After spreading the cement on the wood and applying the metal on top, if it is possible, glide the metal about a little with a rotating motion and the adhesive qualities of the cement will be improved.

When stainless steel is used to cover a wall, say a baseboard under a hood, nothing lighter

(*Continued from page* 112)



Where soldered seams are long, provision must be made to prevent buckling. In the Gichner shop, wood or angle iron strips with asbestos paper between the strip and the stainless and the whole closely clamped together as shown eliminates all buckling.

Methods for Joining Pieces Must Be Stressed in

"Streamlined" Sheet Metal Training

By Ernest E. Zideck

Instructor, Technical School, Jackson, Michigan

WHETHER engaged in lay-out, in shearing, in provisioning or in braking-forming, the worker in sheet metal will profit by a full knowledge of the means, or modes, of joining sheet metal. The layout man will profit because such a knowledge will enable him to understand the print or the specification and proceed in his work with precaution and pre-science of what the lay-out should be. The shearman and the provisioner will benefit from knowing joining because the knowledge of such methods will acquaint him with the pattern and give him a directive in his work. The braking operator's knowledge of joining will make it easy for him to follow instructions contained on the pattern or in the print and do his work with a foresight instead of going ahead with it blindly.

Many Methods of Joining

In sheet metal constructions there are a great variety of joining methods. There is the simple, soldered lap, still predominant in tinware, brass and copper, zinc and the galvanized sheet joint. Then there is the lockseam, applying to the lighter gauges in all metals with the exclusion of zinc, which, in most cases, would break in seaming. In roofing, the making of valleys, sidings and similar constructions applies the double seam, upstanding or flattened down, and the double seam also is used in tinware and brass, copper and galvanized sheet utensils, such as washboilers, kitchen and restaurant vessels and ice cream parlor tanks. There are a number of the single seam and the double seam varieties, one applying to seamed-on bottoms, for instance, the other to in-set ends, the third to roof-flanges and the fourth to all kinds of other items in which it is the most practical to use.

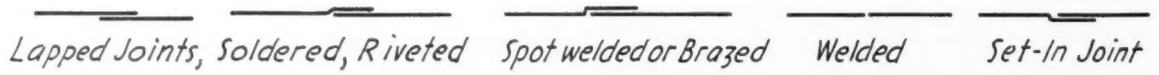
Another group of seams has become popular with the introduction of the "Pittsburgh Lock," notably so in the construction of air-conditioning ducts and fittings, in which seldom any soldering or riveting is done and never brazing or welding, except on the heavy gauge fan housings and their connections. In industrial sheet metal work, working in heavier gauges, riveting and lately spot-welding, acetylene and arc welding are the means of joining metal. And in the fabrication of metal furniture and of cabinets, stoves or heaters, vehicle bodies and diverse other sheet metal or plate construction the parts are partly riveted, partly bolted together, with the sheets or plates spot-welded, acetylene welded or arc-welded one to the other.

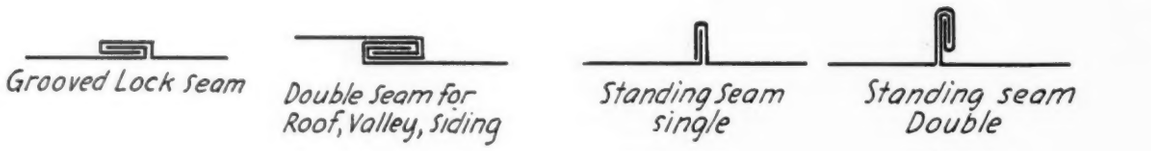
Each of the above methods of joining sheet metal requires a distinct "provision" in the blank or metal worked: the soldered lap requires notch-outs for reinforcement and bottoms or ends; the lockseam calls for similar notchouts, only more so, because the seam could not extend where the wire or doubled or trebled metal is used to reinforce the edge of the construction; and these same notchouts in the metal apply doubly so if the pipe or duct or oval or oblong or square shaped item is double seamed or provided with a Pittsburgh Lock as a means of joining. Notchouts apply to any lapped joint, be it soldered, spotwelded, brazed or riveted, because the double metals obtained by one lapping over the other in such joints could not be readily worked in either reinforcing the construction along the edges or fastening bottoms or ends to it.

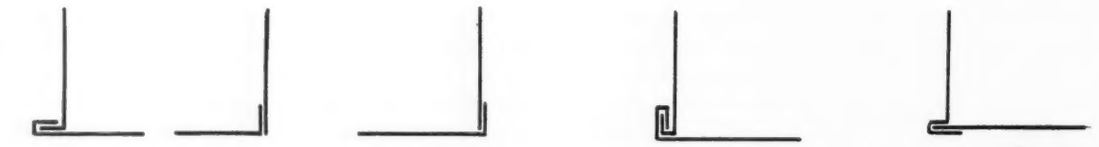
The "Lap" Gives the Joint Its Strength

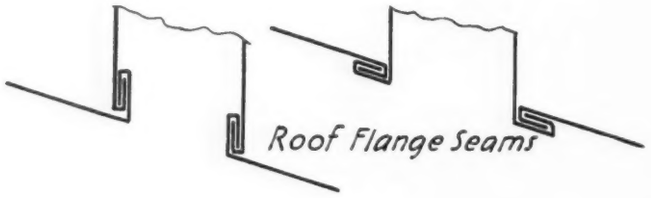
It will be noted that a "lap" is mentioned in "spotwelded" and "brazed" joints along with a "lap" in soldered and riveted joints. Without a lap no soldered joint will hold. Neither will metal hold together when brazed without a lap. In rare cases metals may be spotwelded by butting them and heating them enough in the process to melt and fuse them. Lockseaming by a machine is routine work which calls for familiarity with the machine and its adjustment to different gauges of the metals seamed and to the widths of the seams. The operator who knows his work is alert in feeding the joints to the machine, taking care that the starting end of the seam is tightly drawn be-

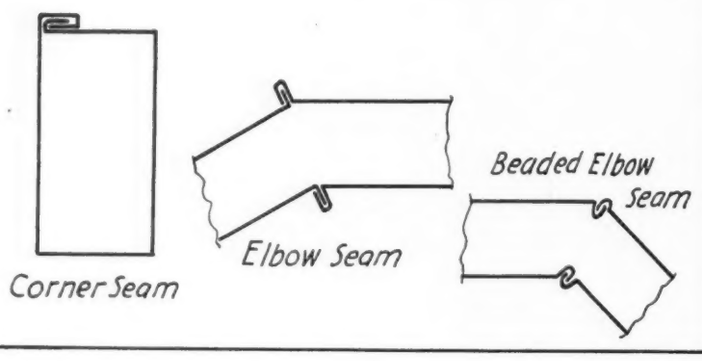
MODES OF JOINING SHEET METAL

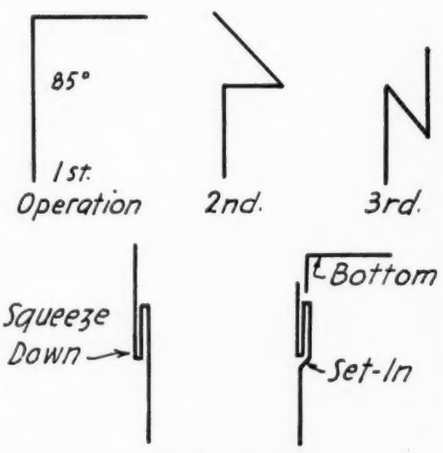








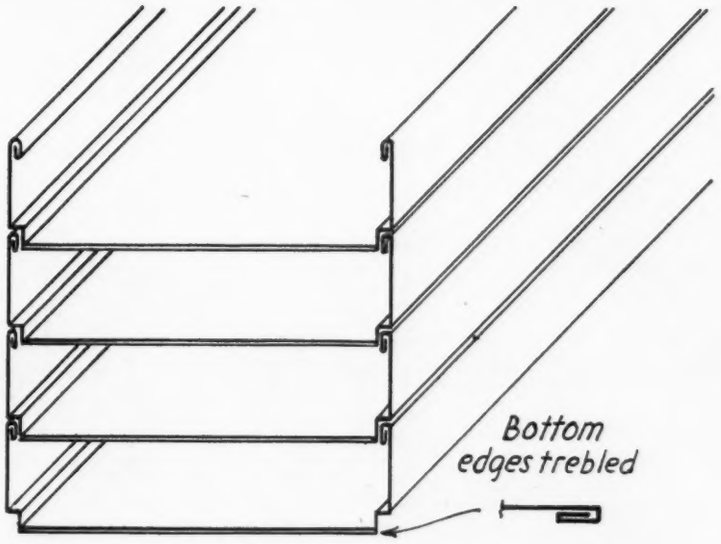




Steps in brake forming a Pittsburgh lock and final assembly.

A simple sheet metal construction for papers on a teacher's or an office desk.

For more rigid and that much handier construction wire may be inlaid in the sides, the wire forming a frame connecting the tops of the sides and, protruding slightly to the front, serving as handle to the paper basket or tray. Any number of the trays may be placed one upon the other without obstructing the extraction of papers from any one of them.



fore the roller passes over it. Observing this precaution, and holding the other end of the seamed article tight together as the roller passes towards it, these are the two principal requirements in operating the machine.

In lockseaming by hand over a mandrel or a stake we observe that same precaution: start with seaming at the farthest end, holding the seam tightly drawn together; and pass to the nearest end, locking the seam securely, by a grooving tool, at either end before proceeding with seaming in the middle and along the length of the seam. In doing this kind of lock-seaming, the experienced worker will unfold the pipe or item seamed to cause the tension in the metal holding tight the interlocking edges while the grooving tool is being applied to the seam. In any kind of hand-seaming, such as putting on bottoms, or ends to a square object, a hand and a tool dexterity is required that is acquired by experience with such work. Especially in double-seaming bottoms on square or oval items expertness counts much. Not for nothing is there a saying among the elders in the trade that a sheet metal mechanic is recognized by his ability of snugly and smoothly seaming on a bottom to a washboiler.

Joining Is An Interesting Lecture

For the instructor, the variety of mode of joining sheet metal proves a meritorious subject. There are over a dozen different seam constructions, and their application again may approach a dozen variations. The trainee in sheet metal profits considerably by instruction dealing with the modes by which metal may be "seamed" together. This instruction may be given every student, whether he specializes in shearing, provisioning, braking-forming or other work, because the knowledge of the means of joining metal will greatly facilitate his understanding of why his own specialized operation must be executed with utmost care.

Riveting together of lapped metal in which rivet holes are provided prior to forming consists of the insertion of rivets and their "setting" by a rivet set, flattening the rivet and forming a "head" on it. Several precautions must be taken by the man doing riveting, especially if he rivets together metals of light gauge. He must not hit the metal between the rivets. If he does so, the metal will expand, the next rivet holes will be out of line, the lap will bulge out between the rivets, making soldering of the joint difficult. Hammer must not be used in trying to smooth out the riveted joint. A mallet may be used, with the joint reposing tightly over a mandrel or stake, the outstanding rivet heads burying themselves in the wood and the metal drawing tightly together.

"Fitting" Shows Up Previous Faults

In a properly sheared, provisioned and formed item scarcely any "fitting" is executed prior to the soldering, seaming, riveting, spot-welding, brazing or welding of the joint. If any fitting has to be done in any one of the above constructions it indicates that the previous steps in the fabrication of the items have been executed carlessly. But in a more complicated construction, one in which several parts await joining, one dependent on the other, it is prudent, if not unavoidable, to assemble the component parts tentatively, in the manner as they would be assembled for joining, and make sure that one will fit the other.

(*Continued on page* 110)

3-Ounce Roofing Copper Becomes A Material For Art

By Evaline Marshall

A YOUNG Texas woman, Mrs. Margaret Briscoe Whalen, has discovered decorative possibilities in ordinary three-ounce roofing copper, while teaching arts and crafts with the Recreation Department of Redondo Beach, California. It was necessary to find a more inexpensive material for her students to work with than the expensive hammered copper she had always used. With an eye for color and a flare for the unusual, she experimented with roofing copper for their work, was so pleased with it that she has never gone back to the older hammered copper. Neither have any of the students she taught in California before her return to Texas, her native state.

The articles that can be made from this copper are almost numberless, for both office and home. Some of them are name plates for desks, waste baskets, book ends, wall plaques, fireplace screens, and even greeting cards.

Mrs. Whalen explains her method in working with roofing copper as follows: "Take a piece of copper somewhat larger than you want the finished piece to be. Trace or draw your design onto the surface with a sharp instrument, maybe a nut pick, then stipple in the background with a plumb-bob. That gives you a rough setting for your smooth raised figures. These figures you work in more definitely with an all-purpose leather tool, a nut pick, or even an orange stick. For fine work I use my thumb nail which has become quite hardened from this use."

Her designs are highly artistic, since she has an unusual background of training in all phases of art, but even amateurs can produce interesting and decorative work, using their own designs or tracing others from various sources; magazines, calendars, even newspaper comics.

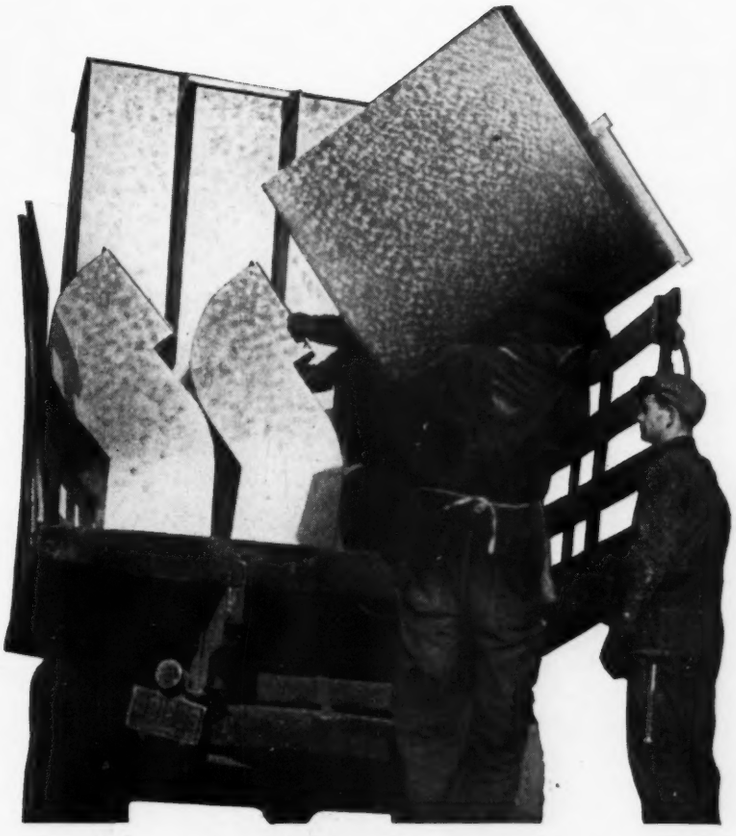
"When I finish with my design," Mrs. Whalen goes on to say, "the whole is oxidized with liver of sulphur to bring out in a few minutes all those rich reds, greens, and purple hues that it takes the sun and rain years to bring out in a copper roof. Then I use a thin coating of water-clear lacquer to preserve the colors I have achieved with the oxidization. Since this copper is very pliable, the entire back of the work is poured full of melted paraffin as a packing. It is then ready for mounting on a hand carved wooden base, maybe a waste basket, maybe a store window sign, or maybe a scrap book cover."

Mrs. Whalen prefers to do animals, or profiles as her designs in this copper, but since the Mexican theme is so popular now in interior decorations, she does a lot of those. She finds the rich, lively colors of the copper lend themselves well to the Mexican art. She thinks entire panels of copper work in dens, libraries, and game rooms of the home would be individual and attractive, and that builders would do well to study the interior possibilities of copper roofing, as well as the exterior.

Different color tones in her work are obtained by applying various degrees of the liver of sulphur for different periods of time. The liver of sulphur can be bought from most any druggist and they can make some suggestions for its use, but Mrs. Whalen feel that best results, as well as the most pleasure, is realized by the beginner experimenting for desired effects.

Big industrial job

or emergency housing . . .



Build for defense with

BETH-CU-LOY GALVANIZED STEEL SHEETS

There's a lot of building construction for defense going forward these days—and a lot of opportunities for you to be of real service. New factories for defense production, new homes for defense workers—both of these require large amounts of expert work on heating and ventilating systems. You can give these defense jobs real defense against corrosion by using Beth-Cu-Loy Galvanized Steel Sheets for all ductwork. Beth-Cu-Loy Sheets are protected, not only by a heavy zinc coating, but also by the addition of 0.20 to 0.30 per cent copper to the steel itself. Impartial tests by the American Society for Testing Materials have proved that a steel base of this copper content outlasts ordinary steel sheets more than two to one. Yet Beth-Cu-Loy costs only a few cents more per sheet.

BETHLEHEM STEEL

BETHLEHEM STEEL COMPANY

ALL DAY... AND FAR INTO THE NIGHT

to maintain Scully Service!

THIS business of working day and night is no mere talk! Every one of the eight Scully warehouses is on the job at all hours to provide the type of service that has made the Scully name famous. Do you need steel, steel products, copper, brass, tools, equipment or machinery? Perhaps we can help you out. We can still make immediate shipment of many items. Call us. You will get prompt, courteous attention—and every bit of co-operation we are able to give.

And if you don't have a copy of the handy 1941 Scully Stock List and Reference Book, ask for one — it's free.

SCULLY STEEL PRODUCTS COMPANY

Distributors of Steel, Steel Products, Copper and Brass

Warehouses at CHICAGO
ST. PAUL - MINNEAPOLIS
NEWARK, N.J.

The Mark of Quality →

USS Scully Service

CLEVELAND · PITTSBURGH
BOSTON · BALTIMORE
ST. LOUIS

← *The Mark of Service*

UNITED STATES STEEL

Association Activities

Standard Code Application Manual

THE National Warm Air Heating and Air Conditioning Association is planning to release as soon as possible a new manual on gravity warm air heating that will be the most comprehensive, yet simple, manual published on any heating system, bar none. This "Standard Code Application Manual" has been prepared by the Installation Code Committee and Research Advisory Committee of the Association based upon the suggestions offered by Professor S. Konzo at the time of the last meeting of the Association.

The method of figuring heat losses may properly be termed the "National Association Method." It is far simpler than most "short-cut" methods and yet is rigidly precise. It is hoped this code will be the *accepted* method in the future.

Standardized sizes of leaders, stacks, registers, grilles, and ducts are "National Association" sizes that have been seleced by joint action of industry and the Research staff.

After the release of this pamphlet the industry will have done more towards the elimination of odd sizes than any move made up to this time.

A later announcement will appear in this magazine. Dealers and jobbers should contact their suppliers and arrange to secure a copy when it appears. Manufacturers should contact the National Warm Air Heating and Air Conditioning Association, 145 Public Square, Cleveland, Ohio, later for details of costs and distribution. Do not send requests for this publication now. Wait for a later announcement.

◆

Plumbing and Heating Advisory Committee

George Boeddener, Managing Director of the National Warm Air Heating and Air Conditioning Association, advises that on Friday morning, October 10, the Office of Production Management invited a panel of the plumbing and heating industry to meet in the auditorium of the Agriculture Building, South Wing, Washington, D. C. The purpose of this meeting was to have the various subdivisons of the plumbing and heating industry make nominations for a steering committee and a subcommittee. Warm Air Heating was one of the subdivisions. Five manufacturers were nominated for the steering committee of the Warm Air Heating Industry. They are: F. Harmon of the Lennox Furnace Company; C. A. Olsen of the C. A. Olsen Manufacturing Company; W. L. McGrath of the Williamson Heater Company; C. L. Hewitt, Jr., of the L. J. Mueller Company; and A. L. Rybolt of the Rybolt Heater Company.

In connection with the subcommittee of the Warm Air Heating Industry committee, the following gentlemen were nominated: I. L. Jones of the International Heater Company; F. C. Packer of the Payne Furnace and Supply Company; C. L. Hewitt of the L. J. Mueller Furnace Company; Ed Lau of the Lau Blower Company; A. L. Rybolt of the Rybolt Heater Company; W. L. McGrath of the Williamson Heater Company; F. C. Bowers of the United States Register Company; C. M. Selby of the Holland Furnace Company; S. Percival of the Green Colonial Furnace Company, and F. Harmon of Lennox Furnace Company.

According to the rules and regulations of OPM, from these nominations OPM will select two members to represent the industry on the steering committee and four members to represent the industry on the subcommittee.

The Plumbing and Heating Defense Advisory Committee, after it has been set up, will be the vehicle for handling all problems of an industry nature and there will no doubt be many of them. We assume that one of the first decisions to be made by OPM will be in connection with allocations of materials.

Leighton H. Peebles is the man who heads up the Plumbing and Heating Section of the Civilian Supply Section of OPM.

◆

McClintock President Stoker Manufacturers

J. M. McClintock, Chicago, manager, Free-Man Stoker Division, Illinois Iron & Bolt Company, was appointed interim president of the Stoker Manufacturers Association, at a special meeting of the executive committee held in Chicago in October. Mr. McClintock succeeds Frank Hoke of Indianapolis, who resigned to become Indiana state director of contract distribution service for the Office of Production Management, with headquarters in Indianapolis. B. O. Fink, Auburn, Indiana, president, Auburn Foundry, continues as vice president of Stoker Manufacturers Association.

R. W. Conkey, Mendota, Illinois, was appointed treasurer of the Association to succeed Mr. McClintock. Mr. Conkey was also appointed to the executive committee replacing the vacancy created by Mr. Hoke's resignation. E. C. Sammons, Portland, Oregon, vice president, Iron Fireman Manufacturing Company, takes the place of Mr. Hoke as chairman of the stoker industry's National Defense Committee. The members of this important committee, in addition to Mr. Sammons, are:

Louis Schwitzer, Indianapois
J. M. McClintock, Chicago
G. Walter Ostrand, Chicago
Marc G. Bluth, Chicago, Secretary of the Association

Mr. McClintock announced the acceptance of several new members of the Association, as follows: Schwitzer-Cummins Company, Indianapolis; David Bradley Manufacturing Works, Bradley, Illinois; Eddy Stoker Corporation, Chicago; Grossenbacher Furnace Company, Stoker Division, St. Louis; Stok-A-Fire Company, St. Louis, and Kingston Products Corporation, Kokomo, Indiana.

◆

Wisconsin

The September 12 meeting of the Wisconsin Sheet Metal Contractors Association was called to order by President T. P. Brenner and following minutes of the previous meeting and communications, the convention matters took up most of the time and the Convention Committee was instructed to call an early meeting so that arrangements could be effected.

Various problems of the industry were discussed.

Paul L. Biersach, secretary.

◆

New York State

The New York State Sheet Metal, Roofing & Air Conditioning Contractors' Association, Inc., announces their 1942 convention to be held at Utica the last week in March. The exact dates will be given later.

Clarence J. Meyer, State Secretary.

Association Activities . .

Sheet Distributors' Annual

At the annual meeting of The National Association of Sheet Metal Distributors held at the Marlborough-Blenheim, Atlantic City, N. J., on October 15, all of the officers were re-elected. They are:

President—A. J. Becker, Ohio Valley Hdw. & Rfg. Co., Evansville, Ind.
Vice Presidents—Eugene Foley, Bayonne Steel Products Co., Newark, N. J. Geo. O. M. Johnston, McClure-Johnston Co., Pittsburgh, Pa.
Adv. Secretary-Treasurer — Geo. A. Fernley, Philadelphia.
Secretary-Treasurer — Thomas A. Fernley, Jr., Philadelphia.

H. E. Usinger, of Berger Brothers Co., Philadelphia, and Bruce Haines of E. E. Souther Iron Co., St. Louis, were re-elected to the Executive Committee for three years.

J. R. Stuart, Chief, Warehouse Section, Iron and Steel Branch, Office of Production Management, Washington, D. C., talked on "The Steel Distributor and the Defense Program." He stated that jobbers of sheet metal are to take care of demands of small users to the best of their ability. They will get an overall priority and get an allotment based on each quarter of last hear.

A. T. Browning, special Assistant to Donald M. Nelson, and president of the U. S. Wall Paper Factories, Inc., Chicago, is arranging to divert metals for consumer goods from the total supply available, equivalent to from 40 to 60 per cent of present production of consumer goods which will apply to furnaces.

The following is briefed from the recent releases of Thomas A. Fernley, Jr., Secretary-Treasurer of The National Association of Sheet Metal Distributors, to members of his association regarding the sheet distribution by steel warehouses as defined by OPM:

Donald M. Nelson, Director of Priorities, has announced that beginning October 15 and monthly thereafter, distributors must file with the Director of Priorities Form PD-83, setting forth deliveries **to** stock and deliveries **from** stock during the preceding month, including steel on consignment, but excluding direct shipments and items picked up from other distributors. These deliveries are to be reported according to the group and product classifications set forth on Form PD-73. It is, therefore necessary for each distributor to obtain from its customers when orders are placed, such information as will enable the distributor to complete his monthly form PD-83. On the forms of October 15, January 15th, April 15th and July 15th, distributors must set forth inventories at the end of the preceding quarters.

Group classifications cover A—Army-Navy; B—Maritime—U. S. Agencies; C—Lend-Lease; D—Priorities Division (civilian customers); E—other export; F—Warehouses; G—OPACS; and H—all other.

Based on the information given on Form PD-83a, the Director of Priorities will determine the percentage of deliveries during the first quarter of 1941 which may be delivered to stock during the last three months of 1941, and issue a certificate assigning a preference rating of A-9 to cover the limits of a quota. Quotas are established for each calendar quarter, and steel not shipped to a warehouse in any quarter under the quota provided for that period, may be delivered in a subsequent quarter only if it is deducted from the quota for the subsequent period.

Steel Warehouse Report PD-83 gives information regarding group and product classifications. Distributors who carry only steel in Product Classifications, 8, 11, 13, 15 and 18 [hot rolled bars, concrete reinforcing; pipe and tubes; wire and wire products including fence posts; tin and terne plate (hot rolled and cold reduced); sheets and strip galvanized] are not required to file reports on Form PD-83. Form PD-83 must be filled out by all distributors who carry any steel in other product classifications and must include complete figures on the five product classifications mentioned above.

A preference rating of A-9 has been assigned to deliveries to be made by a producer to any warehouse in an amount not to exceed 80 per cent of hot rolled concrete reinforcing bars (unfabricated); 80 per cent of pipe and tubes; 70 per cent of wire and wire products, including fence posts (includes wire, woven wire fence, barbed wire, nails and staples, bale ties, fence posts and gates); 70 per cent of tin and terne plate; and 50 per cent of galvanized sheet and strip. These percentages indicate such class of products delivered to a warehouse during the corresponding calendar quarter of 1940.

OPM advises that quotas assigned steel distributors on all product classifications except 8, 11, 13, 15 and 18 are one hundred per cent of warehouse shipments during first quarter of this year as reported on Form PD-83a.

◆

Detroit

N. J. Biddle, Executive Secretary of The Detroit Association of Warm Air Heating and Air Conditioning Contractors, Inc., has sent the following on Priorities to his members:

"The priorities situation as pertaining to residential and other small construction is far from complete or satisfactory but here is the factual information we have to date.

"The conservation of materials for defense purposes is under the control of the Priorities Division of the Office of Production Management. It should probably be written PD of OPM to conform to current practice. The Priorities Division (PD) has designated the Federal Housing Administration (FHA) as its fact finding agency to make the primary determination as to whether a house is a defense project or not. If the FHA decides the house can be so classified, they then recommend to the OPM that a priority be issued. (No arrangement has as yet been made for handling emergency repairs.)

"When asking for a priority, the BUILDER must submit a complete itemized list of all materials required such as plumbing, electrical, heating, etc., materials. THE BUILDER SUBMITS THIS LIST AND GETS THE PRIORITY. The FHA check the lists submitted to see that they are not padded.

"Defense housing is housing in a defense area which costs, including the lot, not more than six thousand dollars or which rents for not more than fifty dollars per month per unit. The Detroit Defense Area is bounded roughly by a line drawn from Monroe to Birmingham and then to Mt. Clemens.

"Houses or housing in this class started prior to September 1st are supposed to have the highest preference in this field, repairs next, then new defense housing and after that, non-defense construction if there are any materials left.

"Your association is keeping in the closest possible touch with the situation and will keep you informed when any serious changes occur. The present arrangement was not announced until Monday noon, September 22nd. By five o'clock of the same day notices were in the mail to all members for the meeting to be held in Cass Tech Auditorium on Tuesday evening, September 23rd, at which time Ray Foley of the FHA gave out such information as was then available. There has been no change.

"The situation in regard to materials on the critical list may become even more critical for a time but it is our belief that it will ease up somewhat in from three to six months. Do not be disturbed by the newspaper headlines about scrapping priorities. Even if this applied to construction of defense housing, it would take some time to make the change. It is our understanding that this new method will start in one field and gradually be extended to others. In the meantime the method outlined above still applies and will be enforced.

"The worse threat to the contractor is that the Builder gets the priority order and will probably try to buy direct from our material houses. We must do everything possible to prevent this practice gaining a foothold."

(*Continued on page* 88)

New Products

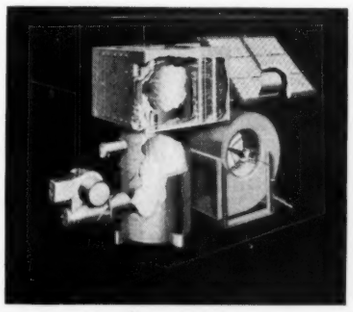
For your convenience a number has been assigned each item. Circle the items in which you are interested on the coupon on page 89 and mail to us.

● Indicates product not listed in 1941 Directory.

△ Indicates manufacturer not listed in 1941 Directory.

176—Fluid Heat Model R-20

Fluid Heat Division, Anchor Post Fence Co., Eastern Ave. and Kane St., Baltimore, Md., is now producing a new air conditioning furnace of 200,000 Btu capacity at the bonnet.

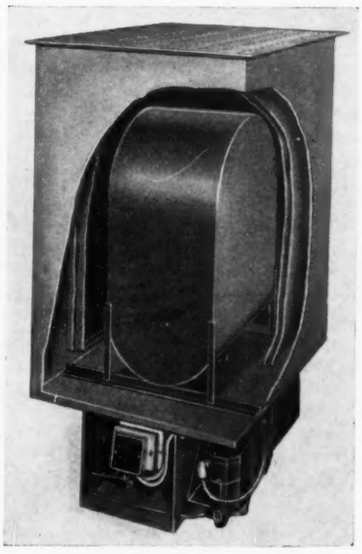


The Model R-20 radiator or secondary heat exchanger is demountable. The air supply passes through ten 2-inch vertical tubes set in the corners of the secondary exchanger where they serve as baffles.

◆

177—Oil Floor Furnaces

H. C. Little Burner Co., Inc., 2nd and Lincoln, San Rafael, Cal., announces a new oil-burning floor furnace especially adapted to small homes, in two sizes—46,000 and 68,000 Btu at the register. The units are completely assembled for installation directly in the floor without the use of ducts or sheet metal work.



These floor furnaces are completely automatic.

△ 178—V-Belt Control

Standard Transmission Equipment Co., 416 W. 8th St., Los Angeles, is introducing a new V-belt variable speed transmission, known as the JFS-Cub—a low-cost control.

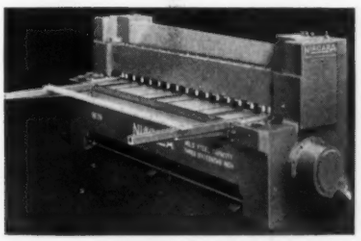
The JFS-Cub is especially designed for all "A" section V-belt applications and for speed ranges up to 3.3-1.

Smooth-sided pulleys are used rather than the interlocking type.

◆

179—Power Squaring Shears

Niagara Machine & Tool Works, 637 Northland Ave., Buffalo, announces the addition of Series 7 line of power squaring shears built in 4 to 12-foot cutting lengths and capacities from ¼ inch to 10-gage; of underdrive design—with drive including flywheel, gearing, clutch, eccentrics and connections completely enclosed and operating in a bath of oil.



More working strokes per hour are made possible by their high operating speed of 60 strokes per minute, combined with convenient, safe handling of stock and off-cut material and other features.

Self-measuring, ball bearing parallel back gage adjustment to increments of 1/128 inch is standard equipment, together with front gage with front brackets, side and bevel gages.

180—Combination Snip

Penn Tool Company, 2415 N. Howard St., Philadelphia, has developed their Pentco combination snip for cutting straight or either right or left curve. Heretofore, two different tools were required to do all the cuts possible with this single tool.

This combination snip is made of Chrome Vanadium Molybdenum alloy steel, hardened and tempered for

rough use. The blades are removable and are serrated to avoid slipping and turning; the handles are of extra heavy cold rolled steel and knurled for better grip; a special locking feature locks the blade when not in use.

The Pentco combination snip is available in three sizes: the 185 for light work makes ¼ in. cut up to 1⅛ in.; the 190 will cut up to 16 gauge and makes ¼ in cut up to 1¾ in.; the 195—the Giant combination—is for larger cuts up to 2¼ in. and cuts up to 18 gauge.

◆

181—Stoker Timer

Perfex Corporation, 500 W. Oklahoma Ave., Milwaukee, announces a new synchronous type stoker timer with a removable timing mechanism, and employing a self-starting line-voltage synchronous motor. Standard model operates at 30 or 60 minute intervals with the "hold fire" period adjustable from 1 to 11 minutes. To test the fire, an external knob is turned until the stoker starts.

New Products . . . . . .

For your convenience in obtaining information regarding these items, use coupon on page 89.

• 182—Calculator

The Dayton Rogers Manufacturing Co., Minneapolis, Minnesota, announces a new, revised and improved sheet and strip weight calculator. This pocket slide rule automatically gives the correct weight of any sheet or strip stock relative to the piece

part weight in the connection with all sheet metal requirements. While the slide rule is primarily laid out for all strip and sheet steel, there is an automatic conversion table for such materials as aluminum, copper, bronze, and other sheet alloys. The piece part weight is instantly recorded after knowing the weight of the stock, including the thickness, together with the length required. It will calculate sheets in width from ⅛ in. to 96 in. wide, in thicknesses from .002 in. to 1 in. thick, and in length from ¼ in. to 1,000 feet.

This new device is very handy for the calculation of weights on all materials used in the average punch press department and is free on receipt of a company's letterhead.

◆

183—Strikeasy Welder

General Eleceric Compeny, 1 River Road, Schenectady, N. Y., announces a new 150-ampere direct-current arc

welder, the Strikeasy, for use in fabricating bright-surfaced, thin-gage metals.

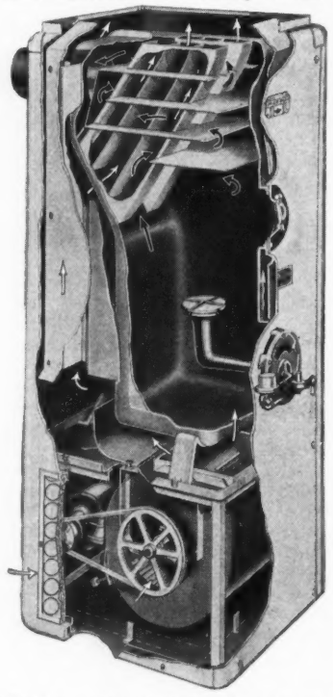
The important feature of the Strikeasy arc welder is its extra high instantaneous recovery of voltage (40 to 60 volts) which helps the operator to strike the arc with ease under the difficulties presented by thin metals having a bright, polished surface. Rapid, accurate adjustment of the welding current is also provided by means of a tap switch and a rheostat; the former for speed in getting wide range adjustments, and the latter for accuracy in obtaining the exact number of amperes needed for best results. The wide welding range permits the use of shielded-arc electrodes as large as $\frac{7}{32}$ in. in diameter and as small as $\frac{3}{64}$ in. in diameter.

The Strikeasy may be used with a remote-control device for reducing the current when the operator wants to fill a weld crater, or when a reduction of heat is needed to avoid burn-through.

◆

• 184—Mor-Mac Model 14-2

Morrison Steel Products, Inc., 601 Amherst St., Buffalo, announces the new Utility model No. 14-2 Mor-Mac tubular winter air conditioner available under priority numbers, for either basement or utility room in-



stallation, and fitted with the Mor-Mac gas burner.

Capacity is 64,000 Btu at the bonnet.

Features include internal and external tubular construction; arc-welded, heavy copper-bearing steel firebox; pre-assembled, attractively finished, die-stamped casing and oversize blower.

Two side-mounted filters, or one bottom mounted filter are optional.

185—Furnace Controls

The Mercoid Corporation, 4201 Belmont Ave., Chicago, announces a redesign in their warm air limit and fan controls. The new instruments are smaller and more compact throughout their entire construction.

A convenient feature is the outside adjustment with full instructions on the face of the cover for making all of the required settings.

The visible calibrated dial, back of a glass panel, plainly indicates the operating range for which the control is set. The range (furnished standard at 70-310 degrees) can be adjusted over the entire scale and the differential can be set for very close operation or widened to meet field conditions.

M-41 is the new type number for the limit control designed to protect automatically heated furnaces from overheating. M-43 is the type number of the fan or blower control which prevents blowing cold air into the rooms if the furnace is not hot enough to deliver heat.

Both of these controls are equipped with non-corrosive mercury switches, a characteristic of all Mercoid Controls.

◆

△ 186—Steel Tubular Heaters

National Heating Company, 401 Essex Building, Minneapolis, offers the National Champion steel tubular heaters—Series 300, 350, 500 and 550—for oil, stoker and gas firing, and designed specifically for churches, schools, factories, auditoriums and commercial buildings.

Heaters are constructed of welded copper bearing boiler plate steel for positive assurance of life-long gas and smoke-tight operation with provision for absorbing all strains resulting from expansion and contraction. The body of the heat generators are long and narrow in design, allowing complete fuel consumption with spaced radiating fins to facilitate maximum heat transmission from this primary heating surface. The radiating section or secondary heating surface is the horizontal tubular type with cylindrical flues extending the full length of the unit from front to rear, providing a fire travel three times the length of heater.

Casings are sturdy, with insulated double metal walls to reduce wasteful radiation of heat in the firing room to a minimum. Finish is an attractive gray baked enamel.

Figurin' the Angles

What smart men do in these times to make money with Fiberglas* Dust-Stop* Air Filters

GET MORE REPLACEMENT WORK WITH DUST-STOP'S FREE SALES PLAN

OUR HUGE DEFENSE PROGRAM is beginning to hit its stride!

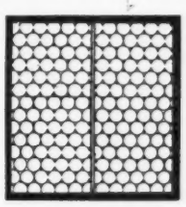
There's a possibility it may cause certain shortages in the metal trades. So start doubling up on your furnace repairing, cleaning, and filter replacement lines . . . right away! They offer you a nice margin of profit. And in areas threatened by a fuel shortage, they help save your customers the Government-suggested 10 per cent on fuel!

What's the best way to rustle up these jobs? Dust-Stop's free sales plan will do the trick!

Mailing pieces . . . postcards, newspaper mats, . . . reminder labels . . . even radio scripts . . . are all yours . . . FREE! And you get your name and address imprinted on them . . . free, too!

Besides the largest set of free dealer helps in the filter field, Dust-Stops also boost your sales with national advertising. Yes, sir! Ads run in American Home, Better Homes and Gardens, Life, and Saturday Evening Post—giving householders the low-down on filters . . . on how often they should change 'em . . . and how they should be sure to buy their Dust-Stops from you!

Every single sale brings you in a good profit. Dust-Stops can pay you a profit of about $2.00 to $3.00 per furnace, per year. Figure that out on 200 or 300 furnaces . . . for as long as a furnace lasts! That's business worth going after!



Dust-Stops pay you still another big dividend! They help you contact new prospects . . . create valuable good will . . . pave the way for other furnace repair or cleaning jobs . . . or profitable work adjusting the automatic firing unit or oil burner.

So jump aboard the Dust-Stop band wagon! Start swelling your filter replacement line . . . right now! Write for Dust-Stop's free sales plan. Tell your manufacturer or jobber to send it to you . . . quickly!

Owens-Corning Fiberglas Corporation, Toledo, Ohio. In Canada, Fiberglas Canada Ltd., Oshawa, Ontario.*

FIBERGLAS* DUSTOP* AIR FILTERS

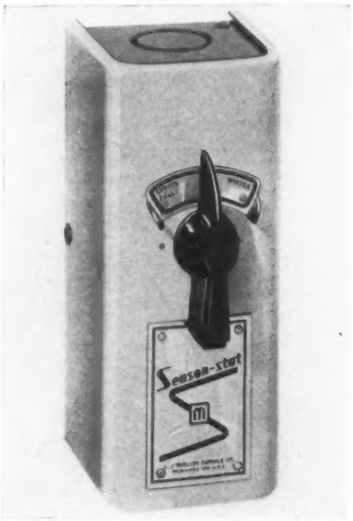
*T.M. Reg. U.S. Pat. Off.

New Products . . . . . .

For your convenience in obtaining information regarding these items, use coupon on page 89.

•187—Season-stat

L. J. Mueller Furnace Company, Milwaukee, has developed Season-stat, a comfort control applicable to either gas, oil or coal-fired automatic heat-



ing equipment. Season-stat slows the heating plant down in mild weather and steps it up in colder weather.

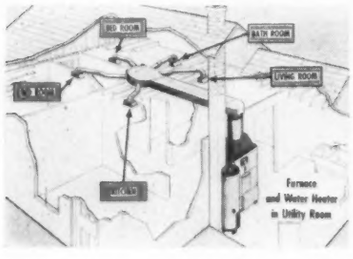
Season-stat may be installed on either new house jobs or furnaces already installed.

◆

•188—Heat Package

The Evanair Division of Evans Products Company, Union Guardian Bldg., Detroit, announces the introduction of its new Evanair Heat Package, a complete heating system and domestic hot water supply for low-cost homes.

The Evanair Heat Package is comprised of three elements—a line of Evanair furnaces to properly heat



every size and type of low-cost house; an entirely new kind of packaged duct system ready for immediate installation known as the Evanair Duct Package; and a line of Evanoil water heaters to provide adequate hot water for large or small families.

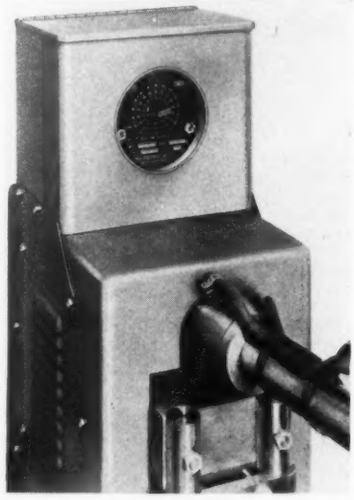
The Evanair Duct Package consists of a single distributing chamber which may be placed either in a hall ceiling, the basement or on the attic floor joists. Location of this chamber depends upon the size and design of the house in which it is installed. Heat is discharged from balanced openings in the side of this chamber direct through piping to wall or ceiling registers. Because of the design of the chamber, which actually is a circulatory plenum, the amount of piping is reduced to an absolute minimum.

The Evanair Duct Package is shipped complete, ready for immediate installation with exception of round pipe and elbows which are available locally. All registers are equipped with adjustable vertical fins and adjustable multiple louver valves for vertical and horizontal deflection of the heated air into the rooms. All register boxes and stackheads are equipped with adjustable flap volume valves for balancing the supply of air through the duct system, eliminating the use of dampers in the supply lines.

◆

•189—Automatic Welder Timer

Pier Equipment Mfg. Co., Milton and Cross Sts., Benton Harbor, Mich., offers Ace spot welders with a new type of precision timer for automatically controlling the welding time



period. Welding time can be quickly selected, and uniform welds assured. The operator simply feeds the work through the welder.

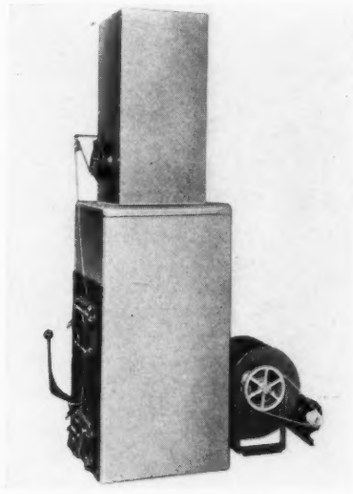
In the development of this new automatic Timer, provision has been made for easy adjustment, there being three concentric scales on a convenient direct-reading dial. The adjustment range is from 3 to 47 cycles (3/60ths to 47/60ths of a second), calibrated in one cycle steps. Once the timing dial is set for a particular job, depressing the foot pedal is followed by closing of the welder contactor, energizing the welding circuit and timing element. At the end of the selected time period, the contactor is automatically tripped and the welding circuit opened. Timer is of the electronic or tube type and maximum timing variation is controlled to a plus or minus 1/120th second on short time welding. Having no relays or other moving elements, it is claimed that timing adjustments are accurately maintained.

◆

•190—Fitzgibbons 80 FWA

Fitzgibbons Boiler Co., Inc., 101 Park Ave., New York City, has designed the 80 FWA coal-burning warm air furnabe with blower and automatic blower control, on the basis of the specifications published by the Procurement Division of the Treasury Department.

The 80 FWA furnace meets the requirements of FWA, USHA, PBA,

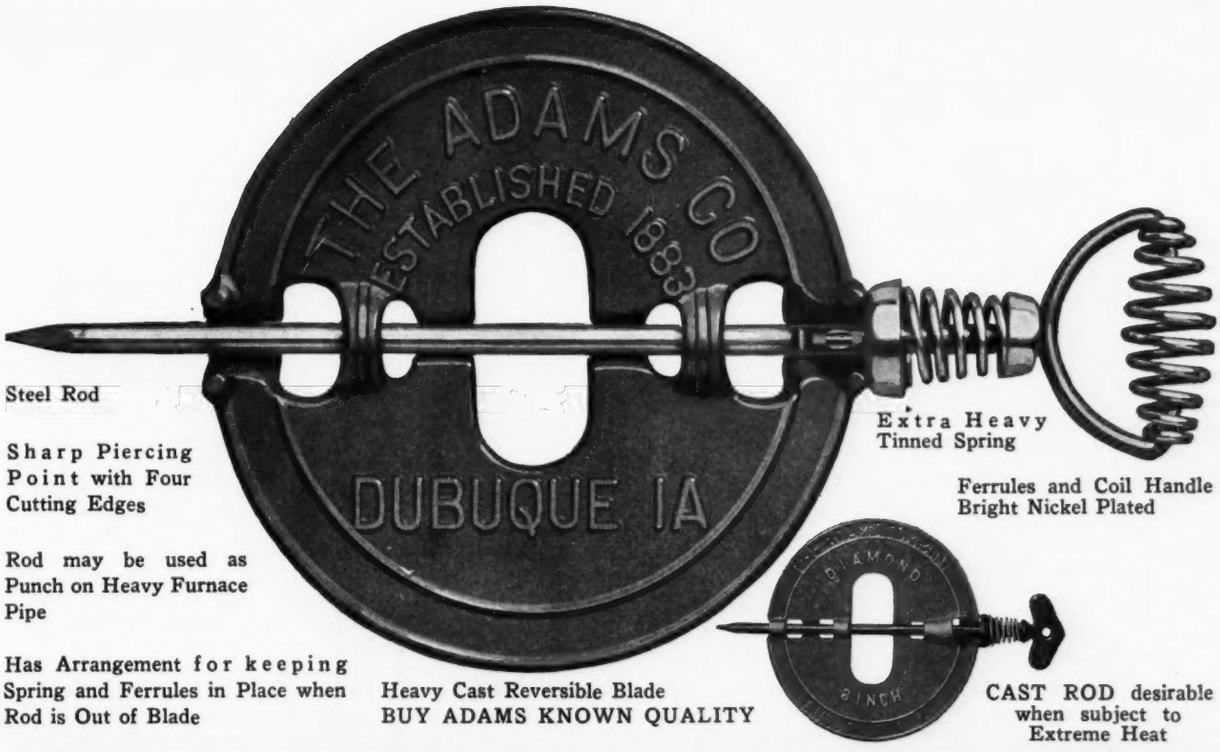


and FSA for Defense Housing. It is jacketed in an insulated, baked enameled grey cabinet with black front, complete with plenum chamber finished in the same color.

The unit requires a minimum floor space of 26x26 in, and is particularly adapted for installation in the utility room of the basementless house.

Features include a one-piece heating unit constructed of heavy copper-bearing steel; "Weldseal" construction; a manually operated regulator for operation of draft and check dampers; a butterfly damper in the firedoor permitting the burning of either anthracite or bituminous coal; a steel inner lining for the jacket; the plenum chamber is capped at the top; an over-sized fan and motor; an electric fan switch actuated by a control in the plenum; large coal-firing service and ashpit doors; heavy long-life grey iron grates; and a fitted pre-cast high test ceramic liner in the firepot.

Bonnet capacity, based on the Standard Code of the National Warm Air Heating and Air Conditioning Association, is 80,000 Btu.



Steel Rod

Sharp Piercing Point with Four Cutting Edges

Rod may be used as Punch on Heavy Furnace Pipe

Has Arrangement for keeping Spring and Ferrules in Place when Rod is Out of Blade

Heavy Cast Reversible Blade
BUY ADAMS KNOWN QUALITY

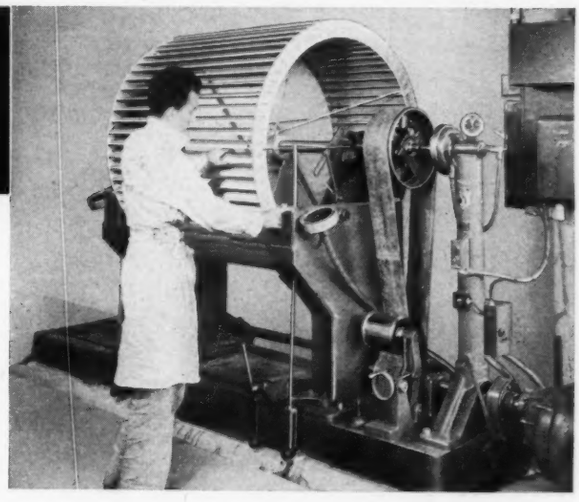
Extra Heavy Tinned Spring

Ferrules and Coil Handle Bright Nickel Plated

CAST ROD desirable when subject to Extreme Heat

DIAMOND SMOKE PIPE DAMPER
Manufactured by THE ADAMS COMPANY Dubuque, Iowa, U.S.A.
ESTABLISHED 1883

Depend on UTILITY



MODEL H C
CLOSET FURNACE

For engineers who combine imagination with sound practice — who consider new designs in the light of experience—who plan heating equipment that is modern—and practical.

All Utility fans and blowers are balanced on dynamic balancers that detect vibrations as small as five hundred thousandths of an inch. Wheels up to 84" can be balanced on this equipment. Dynamic balancing insures quiet, economical operation and long life.

MANUFACTURERS OF FORCED-AIR BASEMENT AND CLOSET FURNACES, FLOOR AND DUAL REGISTER FURNACES, CIRCULATING HEATERS AND UNIT HEATERS

UTILITY FAN CORPORATION
4851 SO. ALAMEDA STREET • LOS ANGELES, CALIFORNIA

Association Activities . .

New York State

The New York State Sheet Metal, Roofing and Air Conditioning Contractors' Association, Inc., in a bulletin dated October 6, calls attention to the existing shortage of galvanized sheets and attaches a copy of a Brief* placed in the proper hands at Washington, D. C., and suggests that members contact Grand President Robert Byron, 500 A. F. of Labor Bldg., Washington, D. C., stating that they are very much interested in immediate relief. Members are urged to write Grand President Byron immediately that they are whole heartedly in accord with the recommendations of the Chicago Committee.

The Committee, entitled to your support for their valuable time and money spent for the good of the industry, consists of

Aubrey Sykes—President Sheet Metal Contractors Association of Cook County.
Louis Narowetz, Jr.—Ventilating & Air Conditioning Contractors Assn. of Chicago.
J. Harvey Manney—Air Conditioning Contractors Alliance.
James Close—Local 73.
Grand President Robert Byron—International Sheet Metal Workers Alliance.

*This Brief was published in the October issue of American Artisan, page 114.

Clarence J. Meyer, Secretary.

◆

Indiana

The District meeting of the Sheet Metal and Warm Air Heating Contractors' Association of Indiana was held in Fort Wayne, Indiana, on August 22nd, with a very good attendance. A large group of state officers and members of the supply trade made the trip from Indianapolis.

The meeting, which was preceded by a dinner, was held in the banquet room of the Wayne Hotel. The principal speaker was Frank Ederle of Grand Rapids, Michigan, former state secretary of the Michigan Association and at present secretary of the Michigan Builders and Traders Exchange.

President Mullin, of Indianapolis, called for a round table discussion of problems arising from recent Defense and OPM requirements. Many interesting angles were considered.

President Cupp of the Fort Wayne Association declared his intention of calling a meeting of the Fort Wayne group to make plans for assisting the jobber in getting materials, by providing priority letters.

Homer Selch, Secretary.

◆

1942 CONVENTIONS

Jan. 26-28—National Warm Air Heating & Air Conditioning Association. Annual. Benjamin Franklin Hotel, Philadelphia.

Jan. 26-30—International Heating and Ventilating Exposition. Seventh Annual. Commercial Museum, Philadelphia.

Jan. 26-30—American Society of Heating & Ventilating Engineers, Annual. Bellevue-Stratford Hotel. Philadelphia. A. V. Hutchinson, Secy., 51 Madison Ave., New York City.

Feb. 2-4—United Roofing Contractors Assn. Annual. Hotel Pennsylvania, New York City.

Feb. 4-5—Indiana Sheet Metal & Warm Air Heating Contractors. Annual. Indianapolis.

Feb. 9-11—Sheet Metal Contractors Association of Wisconsin, Inc. Annual. Hotel Schroeder. Milwaukee.

Sheet Metal Men everywhere are rising to Today's Conditions with their ability . . . their experience . . . their well equipped shops. Niagara Machines and Tools are helping them meet today's requirements for maximum production with minimum effort, accurate work and reliable performance.

NIAGARA
MACHINE & TOOL WORKS
BUFFALO, N. Y.
New York, Cleveland, Detroit

New Literature . . . .

For your convenience in obtaining copies of New Literature use the coupon on this page.

222—Roof Ventilators and Vent Flue Caps

G. C. Breidert Co., 3328 S. Central Ave., Los Angeles, is distributing a 20-page book of specifications with engineering data on their Air-X-Hauster, a 4-page folder showing illustrations of applications, and an envelope stuffer covering the Air-X-Hauster vent flue cap.

◆

223—UsAIRco Light Duty Blowers

United States Air Conditioning Corporation, Northwestern Terminal, Minneapolis, is distributing a 4-page folder covering their light duty blowers, wheels, scrolls and assemblies. Dimension tables of the single and twin blower assembles, blower wheels and scroll housings are included, as well as a performance chart.

◆

224—Quickwork-Whiting Auxiliary Attachments

Quickwork-Whiting Division, Whiting Corporation, Harvey, Ill., is distributing a new bulletin—Unit QW-102—showing special attachments for use on Quickwork-Whiting rotary shears—circle cutting, slitting and flattening gauge, joggling, flanging, and indicating signaling devices. Other Quickwork-Whiting machinery covered are stamping trimmers and power hammers.

◆

225—Double Value Balsam-Wool

Wood Conversion Company, Saint Paul, Minnesota, is distributing a new 20-page, multi-colored book entitled, "Facts About the Magic of New Double Value Balsam-Wool Sealed Insulation." This book goes into the "whys" and "wherefores" of insulation more thoroughly than any of its predecessors.

"Things You Should Know About Insulation," "Condensation—Its Cause and Cure" and "Questions and Answers Regarding Insulation," are a few of the page titles covering the subject of insulation in general and Balsam-Wool in particular. The story of Balsam-Wool from the time it was made available to the consumer 20 years ago up to the present Double Value Balsam-Wool is covered in great detail. Charts, illustrations and photographs graphically and pictorially illustrate this story. Three houses of varying size and design—located in Saint Paul, where winters are severe—are analyzed for proof of Balsam-Wool performance on the job.

Although this new Balsam-Wool book is written primarily for the consumer, it also contains a great deal of data which should be of interest to the dealer.

FOR YOUR CONVENIENCE

American Artisan, 6 N. Michigan Ave.
Chicago, Ill.

Please ask the manufacturer to send me more information about the equipment mentioned under the following reference numbers in "New Products" and "New Literature." (Circle numbers in which you are interested):

176	177	178	179	180	181	182
183	184	185	186	187	188	189
190						
222	223	224	225			

Name .....

Company .....

Address .....

Are you Manufacturer——Jobber——Dealer——

MR. DEALER . . .

ARE YOU "SHORT HANDED?"

CHECK HERE

If the scarcity of skilled labor is one of your present problems, it can be easily solved by insulating your warm air and air conditioning ducts with Dux-Sulation . . . for Dux-Sulation goes on fast and stays on. It comes complete. It saves many hours of each man's time, making them available for your new job much sooner.

ARE YOU SHORT OF MATERIALS?

CHECK HERE

You do not have to worry about material shortages when ducts are insulated with Dux-Sulation . . . for Dux-Sulation is available for immediate shipment . . . 1 roll or 1000 . . . you can count on getting it on time.

ARE YOU LOSING MONEY?

CHECK HERE

If increasing costs and many "extras" are robbing you of your profit . . . use Dux-Sulation. For Dux-Sulation comes complete, nothing else to buy. No "critical material" gadgets or devices are needed . . . it is ready for application when you get it. It is easy and fast to handle on the job as well as in stock. This gives you the savings that insure your profits.

DO YOUR JOBS "STAY FINISHED?"

CHECK HERE

When Dux-Sulation is used on warm air and air conditioning ducts you can be certain of greater operating efficiency from then on. No more cold rooms . . . heat will be where you want it when you want it. Costly "call backs" will end, and dissatisfied customers will become profitable boosters for you.

ARE YOUR CUSTOMERS SATISFIED?

CHECK HERE

Satisfied customers mean more jobs for you . . . more jobs mean more profit for you. Dux-Sulation makes satisfied customers because it saves them money. For example, each 100 sq. ft. roll of Dux-Sulation on a warm air duct will save approximately 1¼ tons of coal . . . or 162 gallons of oil . . . or 37,870 cubic feet of gas *every heating season.* Yes indeed, Dux-Sulation very often is the remedy for warm air and air conditioning troubles. It makes a year-after-year profit for you and your customers too!

Write for Bulletin 408 at Once!

GRANT WILSON, INC.
4101 West Taylor Street CHICAGO

PLANT RUBBER & ASBESTOS WORKS
537 Brannan Street SAN FRANCISCO

AIR CONDITIONING UTILITIES CO.
8 West 40th Street NEW YORK

ATLAS ASBESTOS CO., LTD.
110 McGill St. MONTREAL, CANADA

INTERNATIONAL PRESENTS

TEN YEAR
Maintenance Agreement

No other furnace can be sold under such an agreement.

You can tell your prospect you will take care of the furnace for ten years without charge—except for smoke pipe repairs or cleaning.

You get paid for any necessary repair work under the Ten Year Maintenance Agreement.

LIKE INSURANCE

Most everyone understands insurance. This agreement is like a full coverage policy. The owner has all necessary repairs without cost, and the term of coverage is ten years—no yearly premium to pay.

EVEN COVERS GRATE BARS

Yes — free replacement of grate bars is included, and with it goes a labor allowance to the dealer for installation.

Think of being able to say to your prospect:

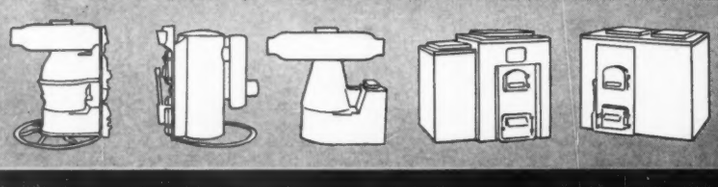
"With this agreement your International Economy Heater will be kept in repair by me for ten years at no charge."

What owner would not avail himself of that protection once it is explained to him. No other furnace is sold under such an agreement.

Write for full information to Dept. A-11, and use this biggest selling help ever offered the heating trade.

INTERNATIONAL HEATER COMPANY
UTICA, N.Y., U.S.A.

WESTERN OFFICE AND WAREHOUSE • 1933 WENTWORTH AVE., CHICAGO, ILL.
NEW ENGLAND OFFICE AND WAREHOUSE • 110 CHESTNUT ST., NASHUA, N. H.
STOCKS CARRIED WITH WHOLESALERS IN ALL PRINCIPAL CITIES



Nelson—Priorities

(*Continued from page 38*)

a shortage such as the one in copper from bringing absolute chaos and utter disorganization to industry.

Think it over for a moment. We've got that copper shortage because we are trying to lick Hitler, not because we have a Division of Priorities in OPM. Take away all of the priorities controls and we'd still have the shortage. And how would the shortage be met? By the maddest, cruellest, most destructive industrial scramble you ever heard of in your life. There is no power on earth that would keep prices from going right up through the roof. The copper would wind up in the hands of those whose job is most important to the country. A gadget-maker might be turning out copper ashtrays and brass andirons while a shell factory stood idle for lack of electric power transmission lines. Chaos is by no means too strong a word to describe the state of things that would inevitably follow.

Under such a situation, the little man would have no chance whatever. He would have neither the financial resources nor the organization to fight for his fair share. He would be licked before he started. Only through some system of priority control does he have the slightest chance of getting what he needs. Obviously, the priorities system helps him much more than it hurts him.

The Construction Industry Dilemma

Last week the Supply Priorities and Allocations Board laid down the broad policy that during the rest of this emergency priorities ratings will not be granted on any materials used in the construction field unless the job for which they are needed is either directly necessary for national defense or essential to the health and safety of the people of the nation. There are factories today which stand idle because they cannot get any copper; would it be fair to let those factories stand idle for that reason while the copper which might have kept them alive is used, say, to help build a new postoffice right across the street? The situation being what it is, would it make anything resembling sense to close a man's shop with one hand and with the other to build a 50-mile electric transmission line to serve a summer resort colony that is inhabited only three months in the year?

Now, to repeat, it is not priorities that is doing all of this. It is shortages; it is war; it is the terrible thing we are up against if we wish to remain free men. Priorities is one of the tools we use to adjust ourselves to these shortages. It is the most important immediate tool; it keeps the shortage from setting us all at each other's throats, so to speak, and enables us to do the job we have to do in spite of the shortage. But it does not, by itself, solve anything. The shortage remains, and the deprivation remains. We must do other things than issue priority ratings in order to solve the problems which shortages bring. We must find some means of adjusting our lives and our economy to this defense effort. We need every pound of material, every man and every machine that we can possibly spare; we must now go beyond priorities action in order to see to it that providing the necessary materials for defense does not involve letting the man and the machine go idle. That can be done and it will be done. It isn't easy and it

can't be done as quickly as we would all wish, but it will be done.

I don't suppose I need to remark that none of us like these shortages. And because we don't like them I would like to pose a question to all of America:

Which would you prefer; to put up with shortages such as we have had so far for year after year—ten years, fifteen years, perhaps longer—or to put up with some really terrific shortages for one or two years and get the job over quickly?

I think we ought to realize that our best and quickest way out of the trouble we are in is to plunge straight ahead and double everything we have done. Are we short of copper and steel and aluminum and so on? Okay: let's make our military demands for those things twice as great as they are now and go *really* short of them, and get this nightmare over with. We don't want to go on living under priority controls for another half-generation. The way to avoid it is to go all-out now and finish it quickly.

School Expenditures $8,791,292

EXPENDITURES of Federal funds to build schools in defense areas are being approved almost daily. The funds, administered by Federal Works Agency, are provided under the Lanham (Community Facilities) Act, approved July 1, which appropriated $150,000,000 for hospitals, sanitary facilities, recreation centers and schools in defense areas.

By Sept. 2 school projects totaling $8,791,292 had been approved, and construction was expected to begin within 60 days.

Federal Works Agency is swamped with applications. Compilation Sept. 2 showed 1,787 applications for $464,935,595 in Federal funds. From school boards came 600 asking $117,369,362 in Federal funds. School sponsors offered $21,576,762, bringing the total value of proposed schools to $138,946,124.

◆

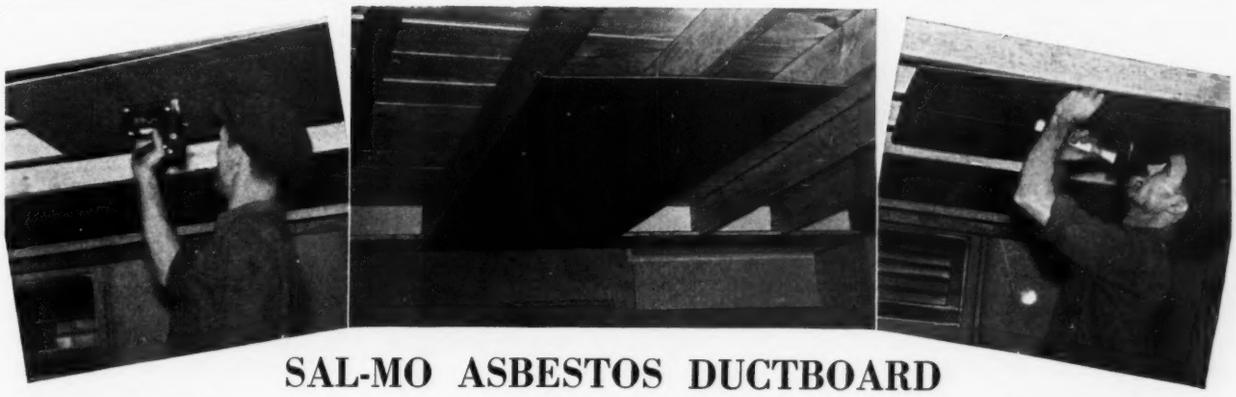
Extension of Rating Barred If Inventory Is Sufficient

AN interpretation relating to the use of inventory materials to fill purchase orders bearing preference ratings, and limiting the circumstances under which preference ratings may be used by a supplier to obtain needed materials, was issued September 29.

1. A producer who has received a defense order may not use a preference rating to procure materials with which to manufacture the defense articles ordered if his inventory is already large enough to let him fill the order and still leave him with a practicable working minimum inventory.

2. If a producer's inventory is below a practicable minimum inventory, he may use a preference rating to procure the needed materials if this use of the preference rating is authorized. In such a case, however, he must not delay manufacture of the defense articles until he has received the materials, but must immediately start manufacture, using materials already in his inventory.

3. If a producer fills a defense order out of inventory materials without himself using a preference rating to obtain needed materials, he may not, after completion of the order, obtain materials to replenish inventory by use of a rating.



SAL-MO ASBESTOS DUCTBOARD

Saves Metal . . . . . Saves Time . . . . . Saves Money

A NEW Asbestos product developed by Sall Mountain Company for making Cold Air Return Ducts in Warm Air Heating Plants.

Because it does the same job usually done with metal, it conserves metals for work where metal only can be used.

EASILY HANDLED **— You save time with Sal-Mo Ductboard. Sheet is 33″ x 48″—right for covering 3 joists spaced at 16″ centers, making 2 cold air return ducts.**

Cut with saw, knife or snips and is speedily applied with hammer and wallboard tacks, or with convenient stapler.

MOISTURE-RESISTANT**—Treated on both sides and on all four edges.**

FIREPROOF AND NON-CONDUCTOR OF ELECTRICITY**—Made of asbestos, it can be used near electrical wiring without danger.**

ATTRACTIVE IN APPEARANCE**—Easy to keep clean. Can be painted or plastered after installation.**

AVAILABLE IN ANY QUANTITY**—Developed to overcome the growing shortage of metals, SAL-MO DUCTBOARD is available in unlimited quantities and with prompt deliveries.**

YOUR DEALER CAN SUPPLY YOU—SEE HIM WITHOUT DELAY

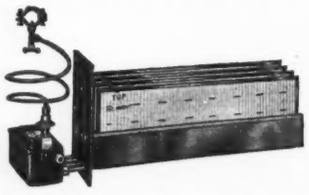
SALL MOUNTAIN COMPANY, 176 W. Adams Street, Chicago, Illinois

FOR EXTRA PROFITS SELL HUMIDITY!

The complete MAID-O'-MIST Line of Humidifiers for every type of heating offers greater opportunities for Extra Profits than ever before. The public is literally thirsty for humidification—and this season they have the money with which to buy. You don't have to do any high pressure selling—just let your customers and prospects know that you can supply them with automatic humidification for any type heating system at moderate cost—and you'll get plenty of business—for selling humidity will open the door for other sales. Write for the MAID-O'-MIST catalog sheet today.

For Warm Air Furnaces

"CONVECTOR" AUTOMATIC HUMIDIFIER



Every furnace heated home needs one of these scientifically designed automatic humidifiers to prevent unhealthful dry-as-dust air all winter. Highly efficient—even the smallest size has an evaporating area many times that of the ordinary pan type. Easily installed and every installation brings you a worth while profit.

Fool-proof, automatic operation. Non-back-siphoning feed valve, approved by National Plumbing Laboratory. Made in a complete range of sizes for straight or sloping front furnaces and priced within the reach of all home owners. MAID-O'-MIST Humidifiers are standard equipment on many of America's leading furnaces.

For Feeding Any Type Humidifier

No. 59-F WATER BOY FEED VALVE WITH ADJUSTABLE WATER LINE

Humidifiers that depend on hand filling for proper functioning are usually non-operative—because the reservoir is empty most of the time. With this clever Feed Valve you can convert any hand-fed pan into an automatic humidifier. Easily installed. Has a non-back-siphoning supply valve required by many city ordinances. Float adjustable to conform to water pressure. Furnished with or without saddle valve, and tubing.

No. 50-F WATER BOY MIDGET FEEDER

For Bucket or Pan Type Humidifiers

It is only necessary to drill two holes to install this popularly priced automatic water-feeder in any furnace water pan. Only 7 in. long overall, with a 1½ in. diameter float, the valve will operate even in one inch of water, a definite advantage where the water pan is shallow. The depth of water at which valve will close is easily adjusted by a thumb screw. Comes complete as shown, or valve sold separately.

The units shown here are but a few from the complete MAID-O'-MIST Line. In addition, there are humidifiers for every type of heating—Steam, Hot Water, and Vapor as well as Warm Air. All are described completely in our Catalog Sheet No. 701. Sent FREE on Request.

MAID-O'-MIST INC.

213 NORTH ABERDEEN STREET
CHICAGO ILLINOIS

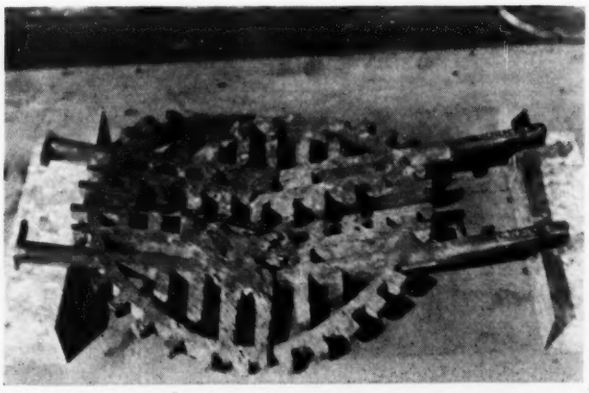
AUTOMATIC HUMIDIFIERS FOR ALL TYPES OF HEATING SYSTEMS

Check List For "Tuning" the Furnace

(*Continued from page* 53)

automobile operating 60,000 miles at 30 miles per hour equivalent to only 2000 hours of service. Or a domestic washing machine operated 3 hours a week for 20 years is equivalent to only 3100 hours of service. On the basis of hours of service, a good heating plant is sadly underpriced.

12) The joints in the smoke pipe should be riveted or fastened with metal screws. The smoke pipe should be made secure so that any ordinary explosion in the furnace will not shake down the smoke pipe. The Dartmouth Fraternity tragedy of several years ago should serve to remind all heating contractors that a weak smoke pipe is a hazard. In this tragedy, an explosion of the flue gases blew



"What Burns Out Grates" is still a debatable argument. But the net result of the combination of a full ash pit and a roaring fire is pictured above.

open the doors of the boiler and caused the smoke pipe to fall down. The carbon monoxide released in the basement eventually snuffed out the lives of several men sleeping in the house.

It is possible to have small combustion explosions, particularly when a high volatile coal is used. The tendency to explosiveness is aggravated when the fuel bed is smothered with green coal and when the overfire damper is shut. Ordinarily these small puffs do little harm. The cost of a tight, well-secured chimney can be considered as a good form of life insurance.

13) It is continually necessary to remind homeowners that ashes should not be allowed to accumulate in the ash pit, and that it is good practice to stop shaking the grates when the first live coals appear in the ash pit. "You can smother your liver with onions or your sweetheart with kisses, but never, never smother your grates with ashes."

Defense House Heating

(*Continued from page 47*)

One striking point in this low-cost housing survey is the fact that except in "boggy" places cellars usually are fully excavated here. This removes the necessity of enforced ingenuity in heater placement. Long Island's rock-free, sandy soil, it develops, does not raise unduly excavation costs, whereas there appears to be a decided customer preference for the fully excavated basement. At points where ground dampness precludes excavation, the common practice is to lay a full-size, 6-inch thick, concrete pan under the entire house. This, in turn, has brought into being what are known as "utility" rooms.

Houses Not Bought by Defense Workers

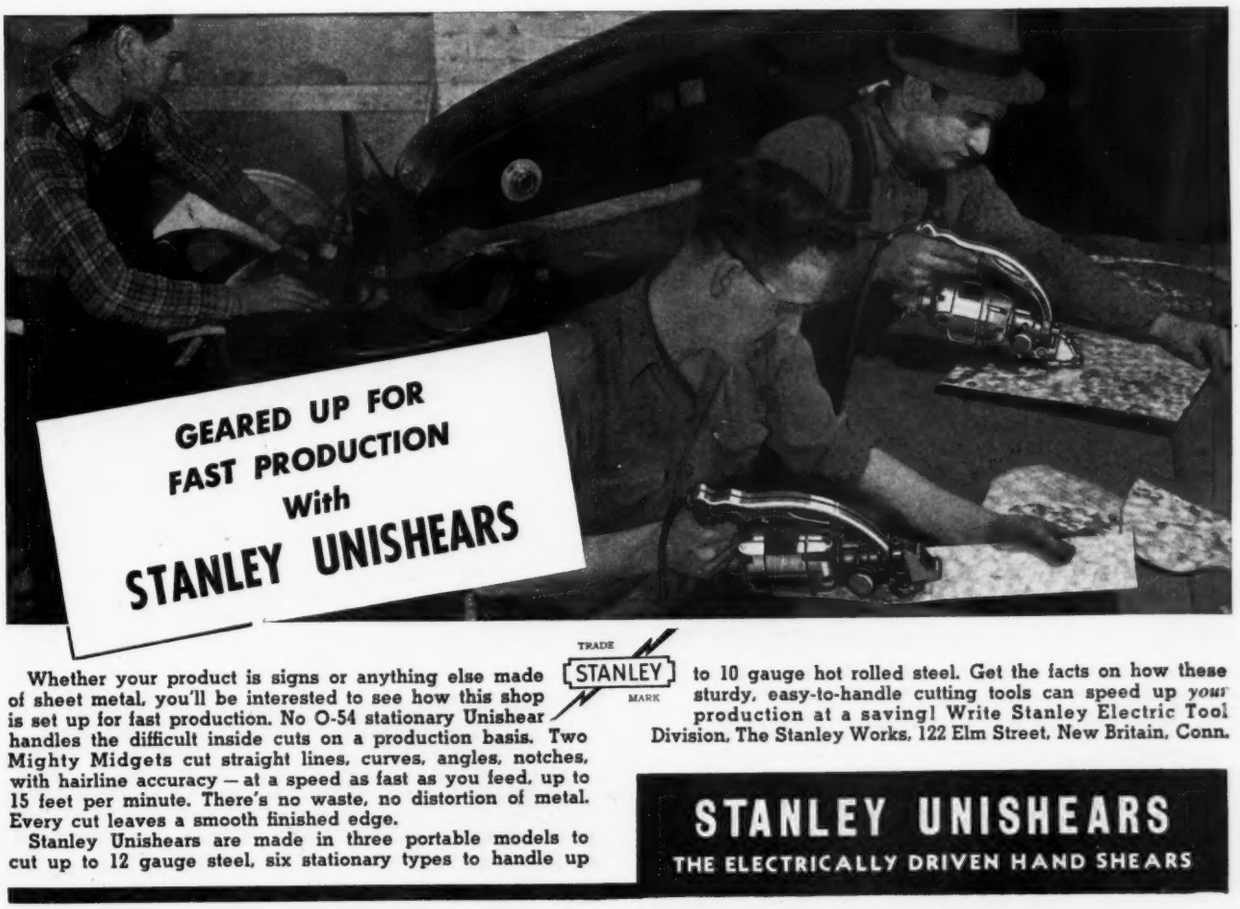
It is observable that purchasers of these "defense" dwellings usually are not defense workers at this date, but former city residents driven out by high rents and responding at the same time to the lure of fresh air and green pastures. Offhand, it is estimated that less than 10 per cent of "Defense" homes are being acquired by workers in defense plants.

Heating is 10 Per Cent of Cost

Another pointer observed is that heating contractors and builders alike are disposing of their goods and services at profitable figures. Heating costs seem to run about 10 per cent of construction cost, so that heating contractors as a rule are receiving between $200 and $300 for their materials and labor.

Considering that the average small house coming within the scope of this survey is of five and four rooms, selling prices of the completed dwellings below $4,000, the heating contract has become attractive.

It is quickly apparent that more art and ingenuity have come into the equipment of this type of low-cost home. Selling prices have advanced but little, equipment is equally as good as formerly, building costs seem to have advanced little. Heating contractors and builders, however, who usually get their heads together in advance of construction, agree on cost-cutting features. Among these were noted the following: gravity warm air plants with round leaders, "loop" supply duct systems, oil fired plants in the ascendant, although plenty of coal-fired plants also are evident, spot-welded fittings, low fuel requirement as a sales factor.



Whether your product is signs or anything else made of sheet metal, you'll be interested to see how this shop is set up for fast production. No O-54 stationary Unishear handles the difficult inside cuts on a production basis. Two Mighty Midgets cut straight lines, curves, angles, notches, with hairline accuracy — at a speed as fast as you feed, up to 15 feet per minute. There's no waste, no distortion of metal. Every cut leaves a smooth finished edge.

Stanley Unishears are made in three portable models to cut up to 12 gauge steel, six stationary types to handle up to 10 gauge hot rolled steel. Get the facts on how these sturdy, easy-to-handle cutting tools can speed up *your* production at a saving! Write Stanley Electric Tool Division, The Stanley Works, 122 Elm Street, New Britain, Conn.

TRADE STANLEY MARK

STANLEY UNISHEARS

THE ELECTRICALLY DRIVEN HAND SHEARS

IT'S A

BIG YEAR for Oil Burning Appliances WITH

Control Dependability!

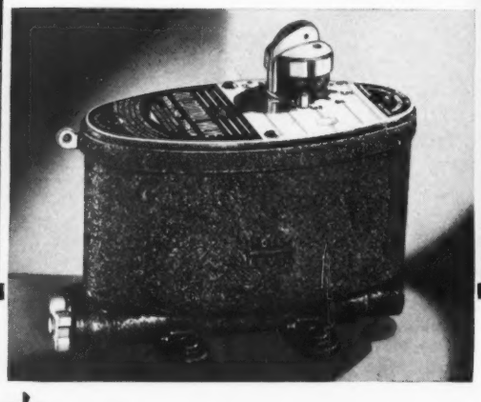
A-P DEPENDABLE Oil Controls clear the road to BIGGER sales volume this year! Used on most leading Oil-Burning Appliances, they offer freedom from service call-backs. And that's important—with the scarcity of experienced service men. They offer Fuel Economy—and THAT'S important, too, for the public's cooperation in Defense Oil Conservation.

But more important than all else, A-P Controls practically guarantee heating efficiency, comfort, and convenience. And if you want to add extra sales volume, and extra customer-satisfaction, you can always install an inexpensive A-P THERMOSTATIC Heat Control Set to make Heater operation completely automatic. Home owners love this new convenience. . . . And it means MORE fuel conservation.

A-P Dependable Controls offer many more advantages. The 1941 "A-P Album of Space Heater Selling" tells about them. Write for YOUR copy now. FREE to all retail salesmen.

★

AUTOMATIC PRODUCTS COMPANY
2452 NORTH THIRTY-SECOND STREET
MILWAUKEE WISCONSIN



DEPENDABLE Oil Control Valves

Government Buying For Defense Housing

(*Continued from page* 40)

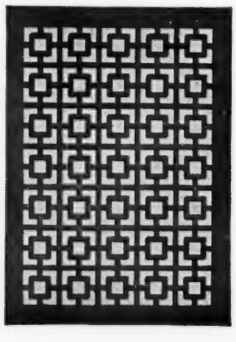
it is to become a part of the direct immediate Presidential business. He probably regards Procurement as complimentary to Budget which is already a part of the Executive set up. The information is of immediate interest to the readers of the American Artisan for it means that in the not remote future they must *mass-sell* their products to an agency immediately under control of the White House.

Housing Volume Planned

As of the middle of October, Government agencies had completed approximately 30,000 housing units. And they had made contracts to build 50,000 more. We know from authentic sources that Government has mass-bought fully half the heating equipment used in these housing units. And we know that practically all heating equipment used in these housing units are forced warm-air furnaces. Government experts have found that space heaters have not been very satisfactory; and they have found heating equipment is necessary everywhere, even in the deep South. It is clear therefore that, since the defense housing program began, the Government has purchased approximately 20,000 furnaces. It is safe to say the proportion has held true to 5 coal or oil funaces—mostly coal—to 1 gas furnace. The price of these furnaces have averaged from $50 to $65, each, f. o. b. factory, and not installed. The same furnaces, provided by bid, by the contractor, from local sources, installed, have averaged $100 each.

PERFORATED METALS

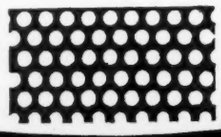
Many designs of Perforated Metal for Architectural Grilles, Radiator Enclosures, Air Conditioners, Cabinets, Safety Guards, and for all screening and sizing operations.



Steel, Stainless Steel, Brass, Bronze, Copper, Monel, Aluminum, Zinc and other metals or materials perforated to your order.

Round holes from .020" to 7". Slot holes from .008" to 3" wide. Square holes of standard sizes. Complete line of brass and tin in small sizes. Prompt Service—Pleasing Prices.

Send us your next specifications.



(Note: Equally spaced holes make for uniform strength, improved appearance and durability.)

The Harrington & King PERFORATING CO.

5649 Fillmore St., Chicago, Ill. New York Office, 114 Liberty St.

Incidentally, it may be interesting to learn that space heaters have been mass-purchased by the Government for prices as low as $14 each.

It is obvious that the Government will itself furnish approximately half of the furnaces that will go into the 50,000 defense housing units now under contract. In the past the Government has mass-purchased in lots ranging from 3,000 to 10,000 furnaces. As part of the mass-purchase contract the manufacturer is required to store the furnaces until they are requisitioned. These requisitions require the shipment of the furnaces in varying lots to the places where defense housing is being built. It is probable that less than 10,000 furnaces are now stored in factory warehouses in various parts of the country. This means, naturally, that Government will, in the near future, purchase at least 15,000 more furnaces. In addition there are at least another 20,000 defense housing contracts in preparation, and of this number at least half will be built directly by the Government, which means it will be in the market for at least 10,000 more furnaces for defense housing units. Therefore there is a prospective firm market by Government mass-purchase for 25,000 furnaces, of which 15,000 will be bought soon, and 10,000 will be purchased as soon as the building of the housing units get under way. Finally, there are the 100,000 units recently announced yet purely in planning, half of which may require mass-purchased furnaces.

Furnace Purchases By Other Agencies

It should be remembered this mass-buying has nothing to do with group-purchasing or group-purchasing arrangements conducted under the direction of other Government agencies. For instance, probably twice as

"Tripl-ife ends all competition worries"

"The Williamson Heater Company:

"When I first started selling furnaces, I always had to look for prospects. After I investigated Williamson 'Tripl-ife' furnaces I thought they were the best on the market. I had to work just as hard selling the first few because they were furnaces of a type that the people of our town had not seen before. But since then, all I usually have to do is explain the superior qualities of the Williamson 'Tripl-ife' furnace, and refer them to some of my customers who have Williamson 'Tripl-ife' furnaces. That ends all competition and gives me a new customer for a Williamson 'Tripl-ife' furnace."

Signed—XYZ, . . . Michigan

Complete information; name, address of writer of above letter furnished on request. Phone, wire or write The Williamson Heater Company.

FREE: Complete, easily understood short method for figuring air conditioning job. You can complete your figures, price job in one hour flat. Write Dept. No. 2. The Williamson Heater Company, Cincinnati, Ohio.

Complete Line . . . Quick Service

WILLIAMSON
WARM AIR FURNACES

This is our Fifty-first year

usAIRco BLOWER FILTER *Units*

YOU can order usAIRco Blower-Filter Units today with assurance of getting IMMEDIATE shipment. But if you expect to get your share of this season's furnace conversion business, *immediate action is advisable.*

Today usAIRco is taking care of its *two* best customers, Uncle Sam and you, without impairing service to either. Tomorrow, with defense needs growing rapidly and material shortages becoming more acute, usAIRco may have only one customer — and you know who!

So take advantage of the present situation while it is still favorable to both of you. Order now while you can still assure your customers of getting *"The Nation's Biggest Blower-Filter Value."*

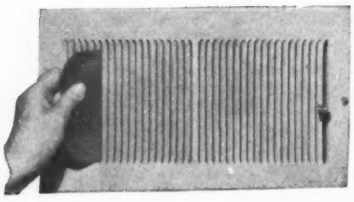
And the delivery and price situation is also favorable on other usAIRco Heating, Cooling, Ventilating and Air Conditioning Equipment. Write us on any of your needs in these lines *today*.

UNITED STATES AIR CONDITIONING CORPORATION

NORTHWESTERN TERMINAL · MINNEAPOLIS, MINN.

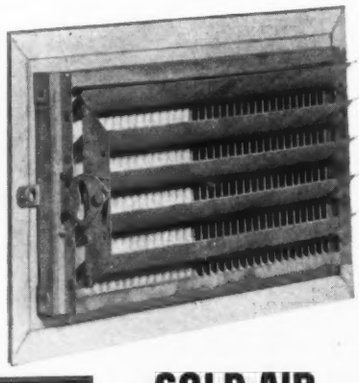
STANDARD
REGISTERS, GRILLES and PERFORATED METALS

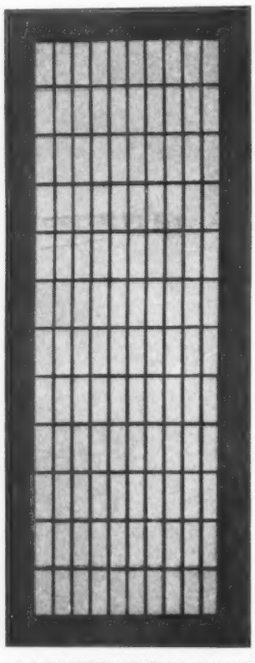
BEND-EZY REGISTERS AND GRILLES



The Bend-Ezy is a durable, attractive register consisting of a group or groups of bendable bars which are set at an angle of 30 degrees at the factory, but which may quickly and easily be set at any desired angle later in the field.

Modern, efficient grilles are the difference between ordinary and superior installations and it will repay you many times to specify the Bend-Ezy whenever possible. Illustration at right shows rear view, with adjustable shutters.

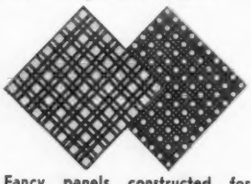




COLD AIR FLOOR FACES

Size of Mesh 5/8" x 1-13/16"

Cold air faces substantially constructed of flat bar stock, having long strips made of .083 (14 gauge steel) x 1/2" deep, and strips running short way of .083 (14 gauge steel) x 3/4" deep. Close mesh—heel proof, no extra cost. Large open air capacity; also beveled edges, made in all standard sizes. Furnished in Japanned black, and oak grained finishes.



Fancy panels constructed for easy bending. These panels are especially adapted for use as stove casings and similar applications, made to your specifications.

WRITE TODAY FOR CATALOG!

STANDARD STAMPING & PERFORATING CO.
3137 W. 49th Pl. Chicago, Ill.

many defense housing units will be built privately with funds provided with underwriting by the Federal Housing Administration as are built with public funds. The Federal Housing Administration does not buy or furnish anything—it simply guarantees the loan which makes the building possible. But as a condition of its guarantee it is setting up standards, and performance to meet these standards in a measure establish certain types of furnaces at certain prices.

This is even more true of Rural Electrification Administration. This agency is designed to furnish electricity to farmers. It builds high-lines and takes wires to the farms. It cannot deal directly with the farmer as a consumer, so it prompts the farmers to organize cooperatives. In almost all the States of the Union it has organized over 800 separate cooperatives with over one million farm families as members. The REA also has authority to loan money to enable the farmer to purchase appliances and equipment whose use in the home has become possible by its electrification. The local cooperative sells the farmer, but the REA *approves the thing to be sold* before it makes the loan.

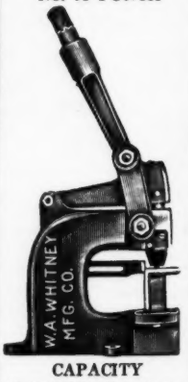
It is quite logical for the REA to suggest prices. For instance, a schedule of the cost of plumbing material outlined by the REA shows a 30-gallon range boiler listed at $8.25; a coal burning or auxiliary water heater at $5.03; and a wall hung sink combination at $17.75. Basically REA does not mass-purchase anything, but a certain local dealer found he could buy for his own home what he needed more cheaply from the REA cooperative than he could buy it *at wholesale* for resale from his jobber. REA approval of an article and the price at which the article is sold creates an outlet for merchandise among 800 cooperatives to more than 1,000,000 live prospects and this approval obviously has all the effect of mass-purchasing.

WHITNEY LEVER PUNCHES

No. 4B PUNCH

Length 8 1/8 inches. Capacity 1/4-inch through 16 gauge. Deep Throat—2 inches. Weight—3 pounds. Punches and Dies—1/8" to 3/8" by 64ths.

No. 91 PUNCH



CAPACITY

1/2-inch hole through 1/4-inch iron; 3/8-inch hole through 1/4-inch iron; 2-inch hole through 1/8-inch iron. Depth throat, 5 inches. Weight, 82 lbs.

We have tools for every purpose needed by Sheet Metal Contractors.

Ask your Jobber.

No. 1 PUNCH

Length — 34 inches. Capacity — 3/8-inch hole through 1/4-inch iron. Punches and dies in sizes from 1/8 to 3/8 by 64ths.

No. 2 PUNCH

Length — 23 inches. Capacity — 3/8-inch hole through 1/4-inch iron. Punches and dies in sizes 3/8-inch to 1/2-inch by 64ths.

No. 6 PUNCH

Length—26 1/2 inches. Capacity — 1/4-inch hole through 3/8-inch iron; especially adapted for button punching or templet work. Punches and dies 1/8" to 3/8" by 32nds.

CHANNEL IRON PUNCH

Companion to No. 2 Punch. Every part of the two Punches Interchangeable, including punches and dies. Capacity—1/4-inch hole through 1/4-inch iron.

W. A. WHITNEY MFG. CO.
636 RACE ST. ROCKFORD, ILL.

Farmers Are a Virgin Field

There has not been much effort, apparently, to sell the farmers furnaces. It seems certain, however, a large percentage of the 1,000,000 farm homes should welcome furnaces with electrically driven blowers or fans. Moreover, the market touched by the REA co-operatives carries a high priority rating. And the farmer has suddenly begun to make more money than he has had in a number of years. To reach the farmer in the REA group it is wise first to discuss your product and your plan with William H. Grove, Chief, Equipment Service Section, Cooperatives Operation Division, Rural Electrification Administration, Washington, D. C. If your specifications and prices meet the approval of Mr. Grove you have progressed far towards doing business with REA highline farmers.

Electric Farm & Home Also Finances

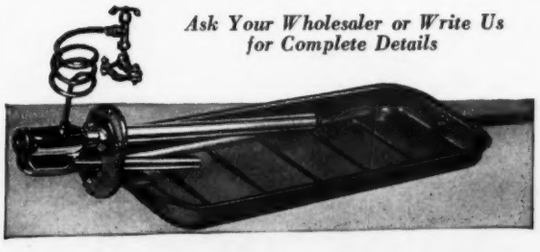
The Electric Home and Farm Authority is another finance agency which provides funds to enable householders to purchase various equipment on credit. The EHFA loans the funds wherever there is a utility, private or public, which will undertake to collect the monthly instalment. It operates in city or country. The dealer or wholesaler sells to the consumer on terms approved by the EHFA, and the EHFA cashes the dealer's—or wholesaler's—contract, and collects the monthly instalments from the consumer through the local utility. In theory the EHFA has no interest in the price of the article, except to be certain the price is commensurate with the standards set up by the EHFA. There is an advantage in having your product listed by the EHFA because the larger part of

Choose your humidifier for *MEASURED* moisture and you'll choose

THERMO-DRIP

- It automatically accelerates, throttles or shuts off the water feed as the temperature in the furnace rises or drops . . . never a fixed amount of water in the pan regardless of whether the furnace is hot or cold . . . never the uncertainty about the amount of vaporization. For, the pan will vaporize only the parade of water drops fed in direct proportion to temperature. That's *measured* moisture!! That's performance that satisfies!

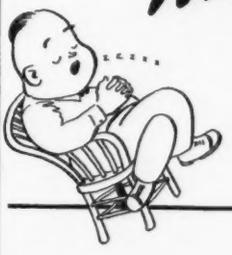
Ask Your Wholesaler or Write Us for Complete Details



AUTOMATIC HUMIDIFIER CO.
18th and Main Street CEDAR FALLS, IOWA

ARE YOU *Planning*

OR JUST *Waiting*



FOR 1942?

You know that the demand for housing will continue to grow rapidly. If new building is curtailed temporarily, then there will be a corresponding increase in the modernization of old homes . . . and there is no better prospect for a stoker than the man who is modernizing his home.

Gehl predicted an increased demand for 1941, and our dealers enjoyed a sales increase of 110 per cent. We feel confident of another increase for 1942 . . . and now is the time to get ready. You can meet the demand in the best way with the

GEHL *Stoker*

In Gehl's new domestic models, the hopper sets closer to the furnace, and provides extra clearance for the fire door. The heavy, all-cast chassis resists rust and corrosion from basement moisture and fuel acids. It gives the Gehl unusual rigidity, eliminates vibration, assures a far longer life than the usual sheet steel type of construction. Rounded corners on retort are an advantage in a round fire pot. These are just a few Gehl advantages that help make sales.

Extra values, national advertising, thousands of satisfied users, all help to keep Gehl out in front. Domestic, commercial and industrial stokers. Hopper and bin-fed models. WRITE today for new literature and dealer plan.

"Stoker Sales are Blowing a Gehl"

Gehl Bros. Mfg. Co.

DEPT. A
ESTABLISHED 1867 WEST BEND, WISCONSIN

its business is transacted with farmers, or with rural communities; and the people of these communities are almost completely blanketed by the high Priority preference.

The Federal Home Loan Bank Board is another finance agency. It touches the manufacturer and dealer in its wideflung rehabilitation program. It has been very successful in prompting thousands of persons and hundreds of communities in completely repairing homes and shops.

The Department of Agriculture through Farm Security Administration also has influence on thousands of rural homes scattered around the United States. Farm Security has one of the best low-cost home building organizations in the Federal Government. It has been employed in building some types of defense housing. Furnaces for these homes have been mass-purchased through the Division of Procurement, and lately through Federal Works Agency. Everett H. Burke is Chief of its Purchase Section, located in Washington at 1320 G Street, N. W.

Several Agencies Building Small Homes

Virtually all Defense housing sponsored by the Army has been built by the Public Buildings Administration of the Federal Works Agency; and much of the Navy Defense housing has been built by the same agency. The Navy, however, itself has one of the best low-cost housing construction agencies in the entire Government set-up. It buys its own supply of furnaces and allied equipment. Commander Ivan Bickelhaupt is in charge. He comes from the construction industry in civil life.

The agencies which build under public funds but

REPAIR PARTS BY THE HUNDREDS!

Norco repair parts for heating plants will help you "Repair for Home Protection." In the Norco line are repair parts by the hundreds . . . we can fill your order promptly!

Let Norco show you how to cooperate with the big government drive to repair existing heating plants. There are scores of service jobs to be done right in your community. You can do them and make substantial profits with Norco repair parts.

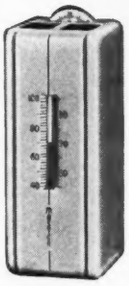
Write us your needs today!

NORTHWESTERN STOVE REPAIR CO.

MANUFACTURERS OF STOVE, FURNACE & BOILER REPAIRS

662 WEST ROOSEVELT ROAD • CHICAGO

ACCURATE DEPENDABLE



MASTER
HEAT REGULATOR
TYPE A-23

Available for Immediate Delivery

Popular priced, yet noted for its long life and trouble-free operation.

Carefully designed for maximum efficiency, this positive, snap-action regulator operates on a differential of only ½ degree.

Build goodwill and satisfied customers by equipping all heating plants with Master Heat Regulators.

Write today for bulletin giving complete information on the Master line.

Makers of Dependable Regulators for 25 Years.

WHITE MFG. CO.

2368 University Ave. ST. PAUL, MINN.

employ local contractors who furnish equipment are the United States Housing Authority, the Defense Housing Corporation of the RFC, and the local subordinate Housing Authorities which work in liaison with the USHA. They have large fields of building operations outside of the conventional Defense housing program. Much detailed information about these and other agencies is contained in a recent publication by the Department of Commerce, looked upon as an invaluable reference book by all Government agencies. The book is called "How to Sell to Government for Civilian Needs. Industrial Series No. 2". It may be obtained by writing to the Department of Commerce, Information Division, Washington, D. C.

◆

House Building Costs Rise

BUILDING costs of a standard six-room house continued a steady rise with 1.1 per cent increase in July over June, Federal Home Loan Bank Board economists have revealed. This brings the cumulative increase for the year—July, 1940 through July, 1941—of construction costs to 11.4 per cent.

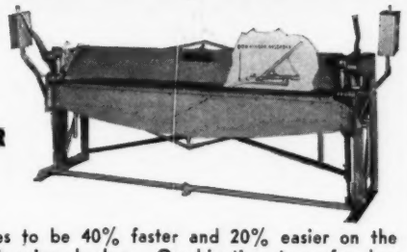
With the average month of 1935-1939 taken as the base month of construction cost index, equaling 100, the figure for July of this year reached 113.6, as compared to 102.0 for July a year ago.

Labor costs in recent years have risen more rapidly than those of materials, and show 15.4 per cent increase since July, 1940. The labor index now stands at 119.3. Building supplies, on the other hand increased but 9.4 per cent during the past year, and show a current index figure of 110.7.

BUY WHITNEY-JENSEN
METAL-WORKING MACHINERY and HAND TOOLS
for LONG LIFE and ACCURACY

BENDING BRAKES

ROLLER BEARINGS *for* **EASIER, FASTER OPERATION**



Tests show these brakes to be 40% faster and 20% easier on the operator than plain bearing brakes. Combination type for box and pan as well as all kinds of straight bending. Hardened jaws for stainless steel. Comes in 12-14-16 ga., 4-5-6-8-10 ft. sizes. Write for literature.

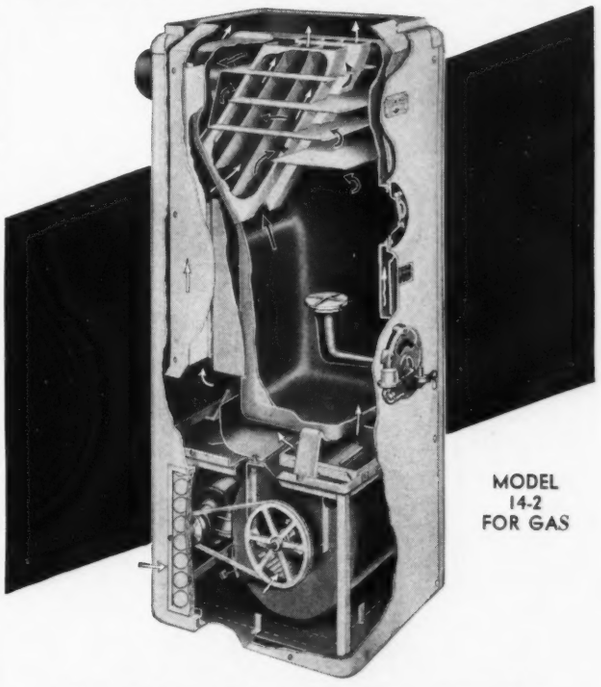
POPULAR No. 5 Jr. PUNCH

In a handy metal kit box, with holder for 6 extra punches and dies. Thousands in daily use the world over. Capacity, ¼" hole in 16 ga. iron, punches in center of 4" circle. Double-duty depth gauge. Available for prompt delivery.

OVER 80 USEFUL SHEET METAL TOOLS

WHITNEY METAL TOOL COMPANY
91 FORBES STREET • ROCKFORD, ILLINOIS

Your BEST BUY for Small Homes and DEFENSE HOUSING



MODEL 14-2 FOR GAS

The Mor-Mac Utility Model *Tubular* Winter Air Conditioner

The Mor-Mac Utility Model is the solution to the question of maintaining your volume in the face of the present difficult conditions. It is a complete, sturdy, attractively designed, conservatively priced, winter air conditioner. Designed for the small home, it is ideal for defense housing needs, and is available under priorities.

The Mor-Mac Utility is built in both gas- and oil-fired models. The gas-fired model shown above comes completely assembled, and equipped with a fixed orifice, twin port, venturi tubular design, universal, gas burner. The burner produces a semi-luminous, full floating, convex flame. Even under the most severe conditions, it has proved to be one of the most efficient and dependable gas burners on the market. Oil-fired models are equipped with a high-grade GUN-TYPE burner.

Capacities and outside dimensions are given below.

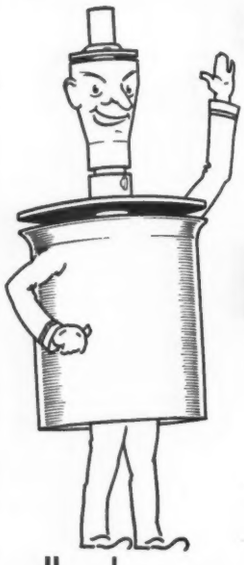
	Gas	Oil
Input	80,000	0.6
Bonnet Output	64,000	67,000
Casing Width	22"	22"
Casing Length	25"	25"
Casing Height	58¾"	58¾"

The Mor-Mac Utility Model is unique among winter air conditioners for small homes with its internal and external tubular construction; arc-welded, heavy copper-bearing steel fire-box; scientific air distribution; pre-assembled, attractively finished, die-stamped casing; over-size blower, etc.

This exceptional line of winter air conditioning equipment may be the means of securing volume for you during the present emergency. Except for a limited number of sample orders, the Mor-Mac Utility Model is available only on priority numbers. Let us give you complete information on the Mor-Mac line of tubular winter air conditioners.

MORRISON STEEL PRODUCTS, INC.
601 Amherst Street Buffalo, New York

We're also helping by building



Good Burners

John Zink Burners are installed in HEATING and POWER BOILERS at

Ft. Benning, Georgia

Camp Gordon, Chamblee, Ga.

Ft. Barrancas, Florida

Twin Engine School
Lubbock, Texas

Air Corps Technical School
Keesler Field, Biloxi, Miss.

U. S. Naval Air Base
Alameda, California

Write for Information

John Zink Company

TULSA, OKLA.—4401 S. PEORIA AVE.

Chicago, Ill.—7309 E. End
New York City—342 Madison Ave.
Houston, Texas—5634 Lawndale

Survey of Sub-contracting Situation

(*Continued from page* 31)

bend certain bar brackets. His previous procedure drilled the holes and then bent the bars. But in a contract specifying to thousandths tolerance this did not work and, as a result, all guards were rejected. The contractor had to take off the bars, buy new bars, bend the bars and then drill. He lost all his anticipated profit.

The above comments should be completely understood. There are, of course, shops in every sizable community, probably, who do work to such specifications, which do have the machines, the mechanics, the gages to do such work—but these shops do not represent the industry. These shops are our specialists—they have always done work to close tolerances or in heavy gauges which the usual shop can't touch.

The point is—practically every one of these specialty shops is now working to full capacity. Many are not working two or three shifts, it is true, but the reason is a lack of mechanics and machine operators—not a lack of work awaiting completion.

If this is the type of shop defense must have,

A Line of Roof Ventilators that Gives You "Everything"

In style or size, there's a Swartwout VENTILATOR to bring you success in licking each ventilation job in industrial or commercial buildings

THE SWARTWOUT COMPANY
18615 Euclid Ave. Cleveland, Ohio

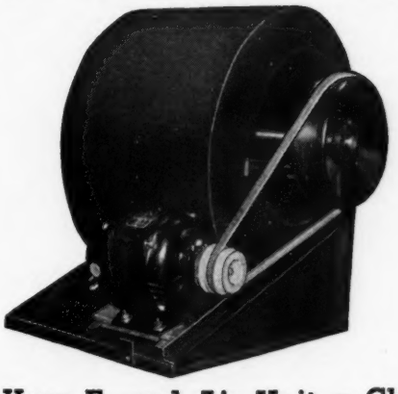
then there is only one thing to do—bring mechanics in from other cities, begin two and three shifts and let the shops from which labor is drafted stand idle. This is not the intent of sub-contracting.

On the easy-to-solve side of the picture are certain encouraging disclosures. Sub-contracting, up to now, has seldom called for the posting of large bond or the going through an elaborate procedure. In every Division of Contract Distribution office there are simple forms which, filled in, tell what you have and what you can do. There are also specialists who can show you what is wanted and tell you how to make it. (In this connection study the report of the sub-contract trains soon to travel and official suggestions published in Defense Developments in this issue).

Also, it has been announced that sub-contracts necessarily need not be let at profitless figures. We heard of one contract in sheet fabrication let at 20 cents per pound which the sub-contractor would probably have bid in at 14 cents or less in competition. It has been officially announced that sub-contracts may be let at 15 per cent above the last awarded figure, when necessary.

Lastly, the Division of Contract Distribution offices have the power, now, to split an award so that parts can go to others than the low bidders. This probably will be used mostly where priorities, or other causes, seemingly have or shortly

VIKING BLOWERS



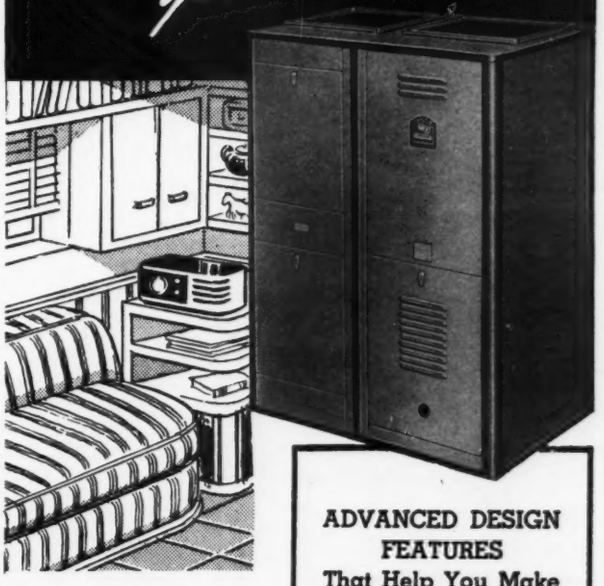
Give Your Forced Air Unit a Chance

To get the most out of your winter air conditioner, you need the blower that, size for size, gives **more air at higher pressure** and with **less noise.** That the VIKING Blower is specially designed to do just that is proved by actual test. That's why leading manufacturers choose VIKING Blowers. Let us show you how you can get greater efficiency in smaller space with less power.

Write Today

VIKING AIR CONDITIONING CORP.
5600 Walworth Ave. Cleveland, Ohio

Pacific writes dollar signs on the profit side of your ledger!



The De Luxe A-69 Forced-Air Furnace typifies the dramatic sales appeal packed into every unit of PACIFIC'S complete, profit-stimulating line.

Behind it are many years experience in furnace design. All the features that count in making sales are there—smart design that enhances the appearance of any well-furnished basement playroom, PLUS unsurpassed performance. . . . Operates quietly and AUTOMATICALLY to air condition your customer's home in winter and ventilate it with refreshing, filtered air in summer.

PACIFIC A-69 furnaces are shipped completely assembled in two separate sections — one containing a blower and the other the heating unit. They are quickly and easily installed on the job without expense of re-assembling, thereby saving time and installation costs.

There are MANY desirable reasons why you and your customers will prefer PACIFIC products. These are explained in our new catalog. You'll be impressed with the liberal PACIFIC Dealer set-up and its unusual opportunities for profit. Write for details TODAY!

ADVANCED DESIGN FEATURES That Help You Make PROFITABLE SALES

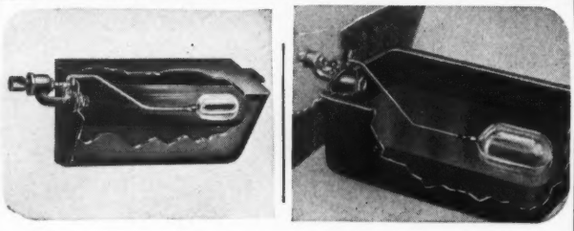
PACIFIC'S exclusive Round Heating Element ...an extra step forward in increasing initial velocity, insuring uniform heat distribution and providing more effective radiation surface. Rigid, durable, leakproof.

PACIFIC Multi-Tubular Burner with heavy cast-iron fire-box liner. Fixed air and gas mixtures provide correct flame and uniform burner operation at all times.

Pacific

GAS RADIATOR CO.
HUNTINGTON PARK, CALIFORNIA

M-VB GIVES YOU WHAT YOU WANT IN HUMIDIFIER VALVES



M-VB's #300 Humidifier Valve *This is the M-VB #305*

Here's what makes M-VB humidifier valves your first (and best) choice:

Pyrex Float Licks corrosion troubles due to mineral content of the water. These pyrex glass floats will stand any reasonable usage. They're checked by the manufacturer—and double-checked by M-VB. *Only M-VB offers this important new float.*

Outside valve mechanism No. 300 and No. 305 have the valve mechanism mounted *outside* the warm air furnace or air conditioning unit...yet the price is still bed-rock.

Large valve passageways Cuts water rush and splashing to an absolute minimum—even under relatively high pressures.

Fast Installation Thirty minutes ought to do the trick easily on the average job.

Long service life Heavy brass castings—good machining—and M-VB quality in general take care of that.

M-VB design and performance have made M-VB quality an accepted fact. If you manufacture—sell—or install warm air furnaces or air conditioning equipment the humidifier valves you want are the ones made by M-VB. See your manufacturer or M-VB right away.

SCOVILL

M-VB MORENCY-VAN BUREN DIVISION
SCOVILL MANUFACTURING CO.
Sturgis, Michigan

SCOVILL SAVES YOU TIME IN SELLING—TIME IN INSTALLING

Complete lines of humidifier valves maintained at Waterville, Connecticut—San Francisco and Los Angeles, California

will create unemployment in a given locality.

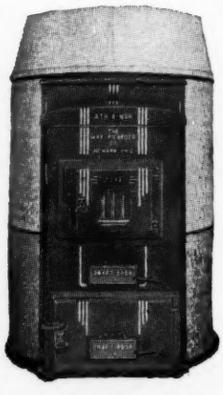
As to what to do if you want sub-contract orders—first of all make a careful listing of all your machines (not hand tools or bench tools) with model number, make, age and—if possible—the tolerances each machine will work to. Prepare a list of products you have made, with quantities and information on details of construction. List your employees and assign to each some rating as to ability. Look over your help market and tell how many men you can hire if you need to.

And then, having armed yourself with this data, pay a visit to the nearest Division of Contract Distribution office (these have been published month by month in AMERICAN ARTISAN or we can give you the nearest office); sit down with the specialists there and see if there is something you can make. If you can't travel, mail your report.

In conclusion—make up your mind that subcontracting is not coming knocking on your door. Everybody is much too busy. You will have to do a selling job here just as you would if you were trying to obtain a private contract.

We realize that many shops have already done most or all of the above and are still waiting a contract. The only answer to this is—machine shop work is the bottle neck—sheet metal fabrication is still a dime-a-dozen—you will just have to keep trying.

50 YEARS OF LEADERSHIP
The Time-Tested ATH-A-NOR



Furnaces, like any other piece of merchandise, are only as good as the people who make them. The May-Fiebeger Company has been making the ATH-A-NOR Furnace illustrated for over fifty years, and the fact that it will perform with unusual efficiency and economy is backed up by hundreds of satisfactory installations.

If you've been looking for a fast-moving, top performing gravity furnace to round out your line, investigate the ATH-A-NOR now! A postcard request will bring literature.

- **QUALITY**
- **ECONOMY**
- **EFFICIENCY**

. . . write today for further information!

MANUFACTURERS OF QUALITY HEATING EQUIPMENT FOR OVER 50 YEARS

MAY-FIEBEGER COMPANY

NEWARK OHIO

Amended P-22

(*Continued from page 33*)

Producer shall, at any time, accept deliveries (whether or not rated pursuant to this Order) of any item of Material to be used as Operating Supplies or for Maintenance or Repair until the Producer's inventory and stores of items of Material of the same class, as carried on the Producer's books, have been reduced to a practical working minimum. Such practical minimum shall in no case exceed the aggregate dollar volume of items of Material of the same class, as carried on the Producer's books, in inventory and stores on December 31, 1940, or, at the Producer's option, at the close of the Producer's fiscal year ending during the calendar year 1940.

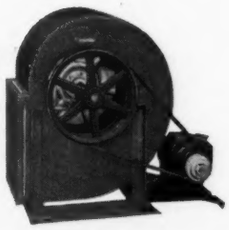
(3) Except as provided in paragraph (g) (5), no Producer shall, during any Calendar Quarterly Period, make withdrawals from stores or inventory of any qitems of Material to be used as Operating Supplies or for maintenance or Repair the aggregate dollar volume of which shall exceed the aggregate dollar volume of the withdrawals of such items of Material of the same class, as carried on the Producer's books, during the corresponding quarter of 1940, or, at the Producer's option, 25% of the aggregate dollar volume of the withdrawals of such items of Material of the same class as carried on the Producer's books during the calendar year 1940.

(4) Notwithstanding the provisions contained in paragraph (g) (1), (2), and (3), a Producer may, upon application to and with the approval of the Director of Priorities, in any Calendar Quarter increase the aggregate dollar volume of deliveries accepted of Ma-

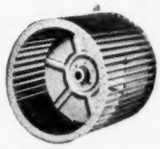
YOUR BLOWER REQUIREMENTS

available at

Schwitzer-Cummins Company



● BLOWERS FOR EVERY PURPOSE
HY-DUTY Blowers, 9 ¾" to 25".
Top and Bottom Horizontal, and Top and Bottom Vertical Discharge.
Top and Bottom Motor Mounting.
Dual Units also available.



● CENTER DISC WHEEL
Double Inlet, Double Width.
Reinforced Center Disc.
Designed for Modern Air Conditioning and Heating Applications.
Sizes, 4 ½" to 50".

● SINGLE INLET WHEELS
For Oil Burner, Stoker, and Air Conditioning Applications.
Sizes, 4 ½" to 50".
Variety of Blade Lengths for each diameter.

● ENGINEERING DATA
Write for Catalogues showing complete Performance Data.
Experienced Engineering Department available to help solve your Air Handling Problems.

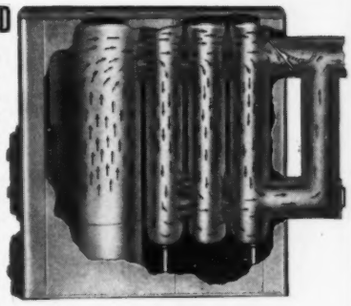
BLOWER DIVISION
SCHWITZER-CUMMINS COMPANY
125 FAN STREET INDIANAPOLIS, U. S. A.

STACK TEMPERATURE Down-SALES GO UP

This patented Automatic Damper is the greatest sales feature in America's most active heating market—the warm air field. And only Leader dealers have this advantage.

HOT GASES TRAPPED

See how simply the KOOLSTACK principle works. Action of the Patented Automatic Damper prevents hot gases escaping up the chimney. Instead they are diverted through the economizer sections until every possible heat unit has been surrendered. An exclusive saving, selling advantage.



SELL ALL *THREE*

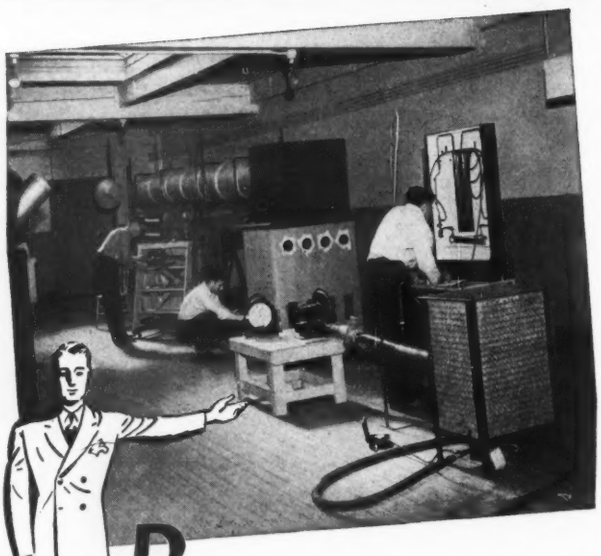
HAND FIRED STOKERS OIL BURNERS

THE Leader dealer meets the needs of EVERY customer, EVERY market. Because KOOLSTACK furnaces operate economically, satisfactorily, whether hand-fired, stoker fired or oil-fired. Yes sir! There's real profit, real opportunity when you can sell ALL three. And that's exactly what the Leader dealer can do. Don't put off writing another minute. Get the money-making facts about your Leader opportunity now.

Leader KOOLSTACK furnaces available in BOTH. cabinet and round-cased types. Gravity or forced air circulation optional. All welded construction. Capacities 50,000 to 200,000 B. T. U.'s.

LEADER IRON WORKS, INC.
DECATUR ILLINOIS
2841 NORTH JASPER ST.

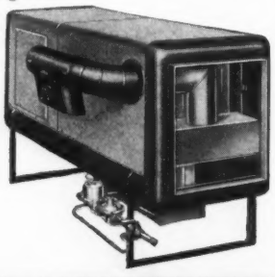
WHY I'M GLAD I SELL PAYNEHEAT



PAYNE ENGINEERS ARE SPECIALISTS IN *Gas* HEAT

IF YOU BELIEVE "Practice Makes Perfect," you'll understand why PAYNEHEAT is nationally famous for efficiency—reliability—fuel economy—long life. ☆ For more than a quarter-century PAYNE engineers have always concentrated on one objective: *Better Gas Heating.* Result: PAYNE today is the Nation's largest exclusive manufacturer of gas heating equipment. ☆ Sixty-nine sizes and styles of units offer the Dealer or Gas Company an answer to any heating problem. ☆ Build for the future with PAYNE'S *versatile 69!*

In the Emergency, our order of delivery is necessarily as follows: (1) U.S. Defense needs; (2) Established Payne Dealer's orders; (3) New business. For further information we cordially invite you to write J. H. Keber, Sales Manager.



PAYNE Spacesaver Unit. One of the versatile 69 models and sizes produced by PAYNE. All are double-tested: AGA plus PAYNE Testing Laboratory.

PAYNEHEAT

MORE THAN A QUARTER-CENTURY OF GAS SPECIALIZATION

Payne Furnace & Supply Co., Inc., Beverly Hills, California

terial for use for Maintenance and Repair or as Operating Supplies, withdrawals of Material for such use, or inventory of Material for such use over the aggregate dollar volume of deliveries, withdrawals or inventory of Material for such uses during the last preceding corresponding Calendar Quarter proportionately to the increase of the volume of goods or services produced or rendered by him in such quarters.

(5) Restrictions contained in paragraphs (g) (1), (2), and (3) shall not apply to any Producer during any Calendar Quarterly Period in which the total volume of his purchases or withdrawals of Material for Maintenance, Repairs, and Operating Supplies does not exceed $2,500.

(h) **Audits and Reports.**

(1) Each Producer or Supplier who applies the preference rating hereby assigned, and each person who accepts a purchase order or contract for Material to which the preference rating is applied, shall submit from time to time to an audit and inspection by duly authorized representatives of the Office of Production Management.

(2) Each such Producer or Supplier shall execute and file with the Office of Production Management such reports and questionnaires as said Office shall from time to time request. No such reports shall be filed until such time as the proper forms are prescribed by the Office of Production Management.

(i) **Utilities and Mines Excepted.** This Order is not applicable to any Utility defined as a Producer in Preference Rating Order No. P-46 (Section 978.1), nor to any Mine as defined in Preference Rating Order No. P-56 (section 982.1). The Director of Priorities may from time to time specifically except further classes of Producers from this Order

An Easy Way to Make EXTRA PROFITS - The

RESEARCH AIR FILTER

FREE Service Selling Kit!

Write for Details Today!

RESEARCH PRODUCTS CORP.

Madison - Wis.

by specific direction.

(j) **False Statements and Penalties.** Any person who applies the preference rating hereby assigned in wilful violation of the terms and provisions of this Order or wilfully falsifies any records which he is required to keep by this Order, or who obtains a delivery of Material by means of a material and wilful mistatement will be forbidden to further apply said rating. Such person may also be prohibited from obtaining further deliveries of Material under allocation and be deprived of any other priorities assistance. The Director of Priorities may also take any other action deemed appropriate, including the making of a recommendation for prosecution under section 35A of the Criminal Code (18 U. S. C. 80).

(k) **Revocation or Modification.** This Order may be revoked or amended by the Director of Priorities at any time as to any Producer or Supplier. In the event of revocation, or upon expiration of this Order, deliveries already rated pursuant to this Order shall be completed in accordance with said rating, but no applications of this rating to any other deliveries shall thereafter be made by the Producer or Supplier affected by said revocation or expiration.

(l) **Effective Date.** This Order shall take effect immediately, and unless sooner revoked shall expire on the 1st day of April, 1942.

(P.D. Reg. 1, Aug. 27, 1941, 6 F.R. 4489; OPM Reg. 3 Amended, Sept. 2, 1941, 6 F.R. 4865; E.O. 8629, Jan. 7, 1941, 6 F.R. 191; E.O. 8875, Aug. 28, 1941, 6 F.R. 4483; sec. 2(a), Public No. 671, 76th Congress, Third Session, as amended by Public No. 89, 77th Congress, First Session; sec. 9, Public No. 783, 76th Congress, Third Session.)

Issued this 16th day of October, 1941.

DONALD M. NELSON,
Director of Priorities.

QUALITY EQUIPMENT-- FROM HESS-- COSTS LESS

DEALERS---Write for our New 1941 Portfolio

By selling — repairing, modernizing or replacements, needed by owners of a majority of heating plants now in use.

• • • •

HESS BLOWER FILTER UNITS
HESS WELDED STEEL FURNACES
HESS AUTOMATIC OIL BURNERS
HESS AUTOMATIC COAL STOKERS

ARE GREATEST VALUES
AT LOWEST PRICES

• • • •

The Hess line is complete for every dealer requirement, distinctively different and more saleable. Financing plan and territory plan—helps Hess dealers.

WRITE FOR DEALER PORTFOLIO
HESS WARMING & VENTILATING CO.
1211-27 S. WESTERN AVE. Founded 1873
CHICAGO, ILLINOIS

AIR-MAZE
FILTER PANELS
are Specially Engineered
for Many and Diverse Uses

The AIR-MAZE panel is perhaps best known as a highly efficient, all-metal, permanent and cleanable air filter for Industrial and Residential Air Conditioning. However it has scores of other important uses for each of which the filter element is specially engineered. A few of these diverse uses follow:

AIR-MAZE for Industrial Ventilation

Many industries whose processes demand dust-free air for great precision and low cost production, as well as for health protection, depend on AIR-MAZE filter panels.

AIR-MAZE "Greastop" for Capturing Entrained Grease

Hotels and restaurants have found in AIR-MAZE "Greastop" panels the effective way to capture grease entrained in the air over kitchen ranges, thus preventing duct fires and protecting health.

AIR-MAZE for Paint Spray Booths

AIR-MAZE panels are used in Paint Spray Booths to prevent excess sprayed material from permeating exhausted air and thereby avoiding deposits outside on persons and buildings.

AIR-MAZE "Inkstop" for Catching Entrained Ink

In the printing industry ventilating devices equipped with AIR-MAZE "Inkstop" panels solve the problem of collecting entrained ink in the air during speed production work.

AIR-MAZE for Eliminating Entrained Moisture

Where entrained moisture in the air must be eliminated, as in evaporative condensers, some types of cooling equipment and certain industrial proceses, special AIR-MAZE filter panels effectively take care of the trouble.

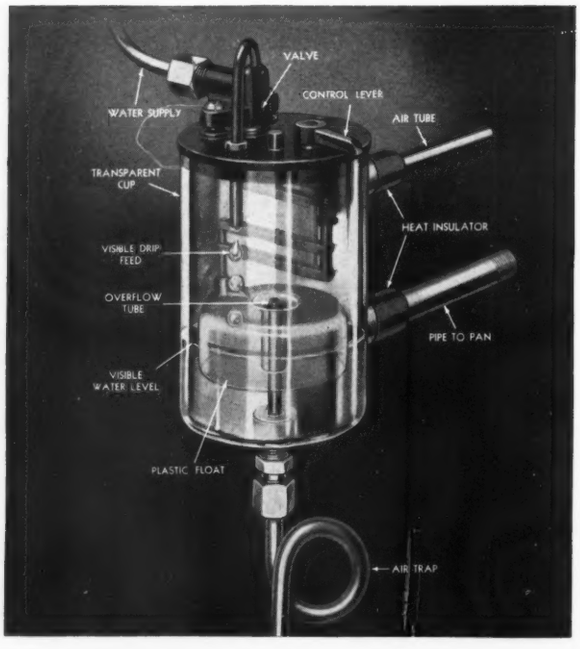
AIR-MAZE for Coping with Entrained Oil

Entrained oil in the air of Oil Spray Booths, Machine Shops and Industrial Plants is often an annoying problem. AIR-MAZE filter panels provide the effective remedy.

Let Us Help You Solve Your Air Filtration Problems

AIR-MAZE CORPORATION
5130 HARVARD AVE. CLEVELAND, OHIO

AIR-MAZE
DEPENDABLE AIR FILTERS FOR EVERY APPLICATION



MONMOUTH FLOTROL

the world's finest float control

The Flotrol has EVERY feature required for a perfectly functioning float control. Other controls claim this or that SINGLE advantage, but Monmouth's acknowledged leadership in humidification engineering provides the Flotrol with ALL these exclusive advantages:

VISIBLE WATER LEVEL—A glance at the transparent Flotrol shows height of water in pan. Unnecessary to remove a hot cover and peer around inside.

VISIBLE DRIP FEED—It's easy to see the Flotrol working and know how fast the water is evaporating. But with other controls you can't tell without opening the furnace.

EXTERNAL WATER LEVEL CONTROL—A mere touch of the finger changes water level and evaporating rate. No guesswork or fussing around inside.

SEALED IN MECHANISM — Because it is absolutely trouble-free, corrosion-proof and lime-proof, the Flotrol is the only control that can be permanently sealed to prevent tampering.

SELF-FLUSHING DIAFRAM VALVE—This enclosed, frictionless, non-leaking and non-liming valve is an exclusive Flotrol feature.

All these advantages and many others make the Flotrol the peer of all float controls. Moderate price due to modern volume production. Get the complete story. Write now to:

MONMOUTH PRODUCTS COMPANY
1933 East 61st Street Cleveland, Ohio

MONMOUTH
The Greatest Name in Humidification

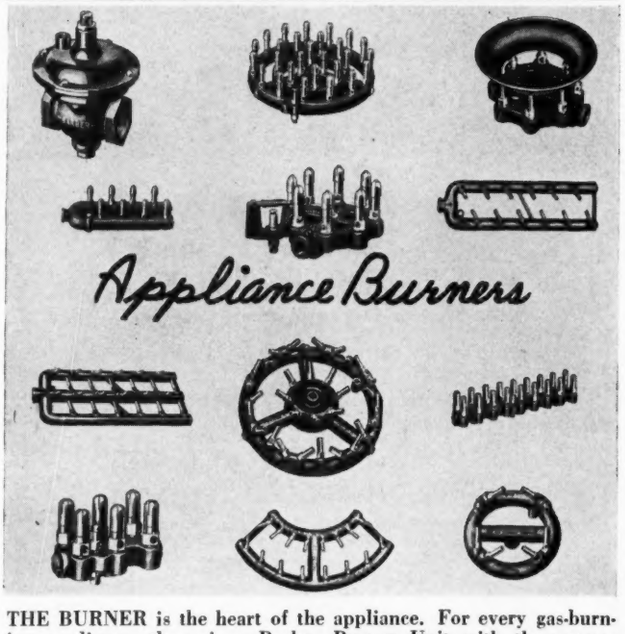
Condensation In Chimneys

(*Continued from page* 50)

draft hood, the installation of such a slip-in liner has almost invariably resulted in elimination or a great reduction in the amount of condensation and marked improvement in the draft conditions which permits proper functioning of the draft hood.

A construction which has been found equally good for gas-fired appliances, especially where they are set at some distance from the chimney, is the installation of an Underwriters approved double pipe or insulated vent close to the appliance and running in partitions up through the building and through the roof. The only restriction for such construction is that there be maintained a minimum distance of one inch between the outer surface of the flue and any combustible material.

In conclusion, it might be said that to vent a gas-burning heating appliance into a masonry chimney, where either a fire clay or sewer tile flue lining is used and without the installation of a slip-in liner, places the owner of such a building in the position of almost certainly having to repair or completely rebuild his chimney within a few years. Many utilites throughout the colder



THE BURNER is the heart of the appliance. For every gas-burning appliance, there is a Barber Burner Unit with the proper jets, and of the correct size and design, to suit the appliance. Barber is the *one* burner which produces perfect combustion on Natural, Manufactured, Mixed, Butane-Propane or Bottled Gas.

Only a few typical models are shown here. Write for Catalog and Prices on complete line of Burners for Appliances, Conversion Burners, and Regulators.

THE BARBER GAS BURNER CO., 3704 Superior Avenue, Cleveland, Ohio

BARBER *Automatic* JET GAS BURNERS

sections of the country have recognized this fact and have insisted that butt joint, tile lined chimneys be provided with slip-in liners before setting gas heating meters.

In our opinion sewer tile lined chimneys are little if any better than butt joint tile, since it is next to impossible, in practice, to secure joints sufficiently tight to prevent leakage of condensation, with ultimate destruction of the masonry. Mortar is not a vapor barrier, and as long as a difference in vapor pressure exists between the flue products within the chimney and the outer air there will be a passage of water vapor from the high pressure side to the low pressure side along the path of least resistance.

◆

Limit Insulation Board Containing Cork

Because of continuing shortages of cork, limitations were placed around deliveries of insulation board containing cork, in a recent order issued by Priorities Director Nelson. Only defense orders, and orders for food preservation purposes, may be filled with such board.

An interpretation of this order, M-8-a, was issued October 16 defining "insulation board to be used for the preservation of food" as that to be used in cabinets and other small cold storage boxes in which the temperature is to be maintained below 20°F., and cold storage rooms and "walk-in" boxes, in which the temperatures are to be kept below 40° F.

"QUALITY"

PAYS BIGGER PROFITS

● With the restriction of materials making big volume business increasingly difficult, it will pay you more than ever to concentrate on QUALITY! On heating and air conditioning jobs where performance and appearance really count—specify Waterloo Registers and Grilles.

WATERLOO REGISTER COMPANY

WATERLOO, IOWA • SEATTLE, WASH.

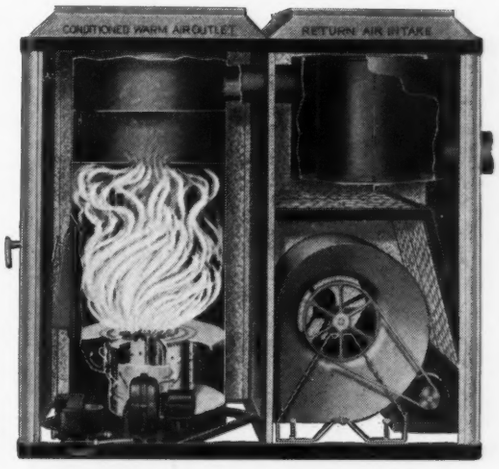
Representatives in Principal Cities

WATERLOO REGISTERS

MONOGRAM

WINTER AIR CONDITIONING

★ ★ FURNACE ★ ★



EFFICIENT · ECONOMICAL AUTOMATIC OIL HEATING

Here's the unit you've wanted for some time. It provides clean, low-cost, dependable oil heating for your customers, and profitable business for you. Equipped with the peerless MONOGRAM "Vaporizing" Burner, this unit is entirely automatic and heats with a clean, quiet gas flame made from oil. Burner has two stage operation, low and high fire, assuring a constant flow of fresh, invigorating warm air at all times. Mechanical draft blower operates only on high fire. Low fire burns clean on .02 chimney draft.

Heating drum has a Double Baffle made possible by the short, wide flame produced by the "Vaporizing" burner. Double baffle stops rush of heat up chimney, increases efficiency and creates a lower heat zone resulting in faster circulation. Only MONOGRAM has the Double Baffle for only MONOGRAM has the "Vaporizing" burner which produces such a clean, efficient flame. Write today for full particulars on the complete line of MONOGRAM Automatic Oil Furnaces.

44th YEAR OF QUALITY

The Quincy Stove Mfg. Company

Quincy • • • Illinois

Sub-contract Trains

(*Continued from page 39*)

10	Wednesday	Indianapolis, Indiana
11	Thursday	Indianapolis, Indiana
12	Friday	Evansville, Indiana
13	Saturday	Louisville, Kentucky
15	Monday	Cincinnati, Ohio
16	Tuesday	Cincinnati, Ohio
17	Wednesday	Columbus, Ohio
18	Thursday	Charleston, West Virginia
19	Friday	Lynchburg, Virginia

WESTERN TRAIN—NUMBER 3

November

10	Monday	
11	Tuesday	
12	Wednesday	Denver, Colorado
13	Thursday	Denver, Colorado
14	Friday	(X)
15	Saturday	Billings, Montana
17	Monday	Salt Lake City, Utah
18	Tuesday	Boise, Idaho
19	Wednesday	Spokane, Washington
21	Friday	Seattle, Washington
22	Saturday	Seattle, Washington
24	Monday	Portland, Oregon
25	Tuesday	(X)
26	Wednesday	Sacramento, California
27	Thursday	San Diego (Noon), California
28	Friday	San Diego, California
29	Saturday	Phoenix, Arizona

December

1	Monday	El Paso, Texsa
2	Tuesday	(X)
3	Wednesday	San Antonio, Texas
4	Thursday	Houston, Texas
5	Friday	Dallas, Texas
6	Saturday	Oklahoma City, Oklahoma
8	Monday	Little Rock, Arkansas
9	Tuesday	Memphis, Tennessee
10	Wednesday	Jackson, Mississippi
11	Thursday	New Orleans, Louisiana
12	Friday	New Orleans, Louisiana
13	Saturday	Mobile, Alabama
15	Monday	Birmingham, Alabama
16	Tuesday	Nashville, Tennessee
17	Wednesday	Chattanooga, Tennessee
18	Thursday	Knoxville, Tennessee

◆

Sub-contracts Relieve Community Unemployment

(*Continued from page 71*)

fan assemblies; unsuccessful bids on a number of other items, and has bids outstanding on other defense work. Since new buildings being equipped to manufacture cartridge cases have a much greater capacity than is being used for present orders, attention should be given to increasing the present contract.

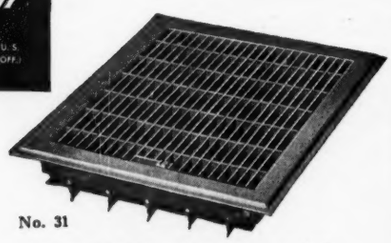
Briggs Industrial Corporation and Chrysler Corporation: Respective operating heads of these two concerns at Detroit, Mich., should exert every effort to inject work into their Evansville plants rather than extending manufacturing activities in Detroit.

Sunbeam Electric Manufacturing Co.: Successful bids have been made and contracts awarded for M-20 Booster and Booster Pump, and subcontracts were arranged in September for work on oxygen air regulators, elevating jacks, gun turret assemblies, and other items. Unsuccessful bids have been made on a number of others.

INDEPENDENT "Fabrikated" (REG. U.S. PAT. OFF.)

FLOOR REGISTERS

If you are looking for the utmost in strength, rigidity and large open area, be sure to specify Independent "Fabrikated." Grille bars are steel strips set on edge, forced together under great pressure, and held firmly in openings cut in outer frame.



No. 31

Close Mesh Openings 3/8" x 1-11/16"

Send for Catalog

THE INDEPENDENT REGISTER CO.
3747 EAST 93RD STREET CLEVELAND, OHIO

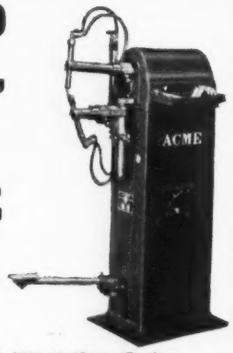
SPOT WELD
WITH AN
ACME "Hot Spot" WELDER

Proven utility for over 26 years in thousands of sheet metal fabricating plants.

Write for Literature and Prices.

Complete Range of Sizes

Lifetime Guarantee!



ACME ELECTRIC WELDER CO.
2618B Fruitland Road Los Angeles, Calif.

ALDRICH

Famous Feature

OIL BURNERS AVAILABLE NOW—NO DELAY

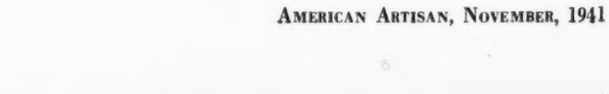
Aldrich anticipated—and built ahead. Right now, you can have the famous, exclusive, sales-building Aldrich features without delay. There's an Aldrich-built burner for every installation. Order now.

ALDRICH COMPANY • WYOMING, ILLINOIS

*VOLUMETER
Controls the air volume without altering static pressure or velocity.

*MAGIC DIAL
Regulates the adjustment of VOLUMETER while the burner is operating.

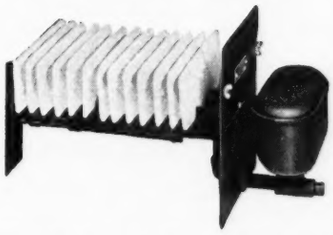
*SERVICE-FREE
Aldrich engineering genius practically eliminates service calls.



700 Sq. Inches

OF EVAPORATING AREA

for only $14.75



• Again Skuttle leads the field by offering you more evaporating area for less money! This Skuttle Series 300 humidifier complete with the new all glass Vapoglas evaporating plates gives you more evaporating area per dollar.

ORDER A UNIT FROM YOUR JOBBER TODAY

SKUTTLE SALES COMPANY
AIR CONDITIONING EQUIPMENT
1015 Franklin Street **Detroit, Michigan**

COLD RUNS BANISHED!

THE VICTOR HEAT BOOSTER

This amazingly effective device not only boosts hot air into hard-to-heat rooms, it boosts profits into the pocket of the furnace man.

The Victor Booster needs only to be set in place, plugged into any electric outlet, and out pours a rich flow of hot air—not from an overfired furnace, but from an ordinary everyday fire. Two models, floor and wall. Liberal Discounts. Write today for detailed literature and prices.

VICTOR ELECTRIC PRODUCTS, Inc.
Dept. HB-7 2950 Robertson Ave. Cincinnati, Ohio

ASK YOUR JOBBER OR WRITE DIRECT

We Use CLARAGE FANS because Every Wheel is BOTH Statically and Dynamically Balanced

At left — complete fan for forced air heating or year-'round conditioning. Very compact. Built in 10 sizes.

Or wheels only in any of 10 sizes to give any desired volume and pressure.

TRY these QUIET-RUNNING UNITS

Standardize on Clarage — and protect your jobs against "fan troubles." Perfectly balanced wheels, improved bearings and slow operating speeds insure QUIETNESS— guarantee long service. Most widely used equipment in your field. Write for Bulletin 33 and see why!

COMPLETE AIR CONDITIONING • COOLING • VENTILATION • FACTORY HEATING • MECHANICAL DRAFT • FANS and BLOWERS for INDUSTRIAL NEEDS

CLARAGE FAN COMPANY—KALAMAZOO, MICH.
SALES ENGINEERING OFFICES IN ALL PRINCIPAL CITIES

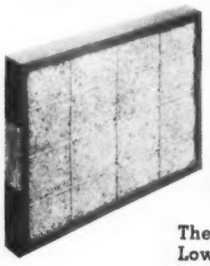
☆ AUTOMATIC GAS SHUT-OFF

MANUAL RESET THERMOCOUPLE TYPE

100% POSITIVE SHUT-OFF FOR WATER HEATERS, FLOOR FURNACES, ETC.

Pilot flame applied to thermocouple element provides all necessary current for valve operation. Valve is of manual reset straight-through gas type, automatically closing upon current flame failure. Standard thermocouple length 30". Valve sizes: ⅜" to 1½". Available for natural, manufactured and liquefied petroleum gases. Ask for Catalog.

GENERAL CONTROLS
801 ALLEN AVENUE **GLENDALE, CALIFORNIA**
BRANCH OFFICES: BOSTON • NEW YORK • PHILADELPHIA • ATLANTA • CLEVELAND
DETROIT • CHICAGO • KANSAS CITY • HOUSTON • DALLAS • SAN FRANCISCO



AXIOM AIR FILTER

The result of fifteen years experience
Lower in cost — Higher in quality
Huge dust capacity—low resistance
Prompt delivery assured
Order now

BLOCKSOM & COMPANY, MICHIGAN CITY, INDIANA

Premier FURNACE CLEANER

STOPS FUEL WASTE!

Increases efficiency . . . saves fuel . . . aids defense! Write today for literature and complete information.

COMPLETELY EQUIPPED
½ H.P. $74.50 • 1 H.P. $89.50
Complete chimney cleaning equipment only . . $10.00

Electric Vacuum Cleaner Co.
1730 Ivanhoe Road • Cleveland, Ohio

BB

HOOKS AND HANGERS

THRU LEADING JOBBERS EVERYWHERE

BERGER BROTHERS CO.

Main Office & Factory
229-237 Arch St.
Philadelphia, Pa.

Branch
16th & Grove Sts.
Jersey City, N. J.

"NEW FIELDS for Profits in NEW METALS"

- CHROME FINISHED COPPER
- CHROME FINISHED STEEL

Write us regarding your problems of designing and trim on interior and exterior finishes.

APOLLO METAL WORKS
6653 S. Oak Park Chicago, Ill.

"Streamlined" Sheet Metal Training

(*Continued from page 77*)

Even in "stamped" parts by expensive dies there is fitting to be done, a correction of a flange, a trimming of the outgrowing metal, a smoothening of wrinkles in a radial part, a co-ordination of slots or holes for sheet metal screws or bolts.

Aside from the above common fitting requirements there are a number of operations cropping up with each multiple-parts construction which must be done *by hand*. If there be pre-fabricated or stamped parts to be joined to the shop-made items, the fitting operations grow in number and proportion. It seldom happens that parts fabricated elsewhere will minutely correspond with parts which we ourselves make. The fitting of these parts, one to the other, must be attended to before their joining, by whatever means or methods, is attempted.

A Good "Fitter" Is a Prized Worker

The work of the *fitter* is rightly called "bench-work." It is done on benches largely, because a surface plate, a stake, a mandrel and other such tools are of use in the work, and because these aids commonly are mounted on a bench. The fitter in sheet metal is called upon to do much intricate work with his hands. He must know his tools and be an expert at using them. He is called upon to make parts "fit"; do it in a manner leaving no ugly marks on the smooth, machine-made formations; and do it speedily.

The fitter in sheet metal is required to do all kinds of intricate trimming or notching by hand shears; to handle a hacksaw expertly; do chiseling at times, handling the tool as a watchmaker would; use a hammer here, a mallet there, a rubber hammer elsewhere; do filing by the smallest and finest of files; use a handpunch occasionally, construct for his own use all kind of aids with which to do the work not possible by any other tool; and generally have his mind and his hand attuned to a real mechanic's task, ingenuity and artisanship comingling, with knowledge of what this or that metal will stand.

Not every student—and not every worker—will be handy with tools and know how to use them. The majority will be clumsy with the hammer, even after long trials remaining ignorant of what this or that beat will do to the metal. They remain untaught in the art of tool-dexterity, no matter how long the class continues or how long working in the sheet metal trade. Others, on the contrary, will show aptitude for doing work by hand tools from the start. These few should be given all opportunity to perform by hand. Riveting, chiseling, hand-punching, hacksawing, hand

USED BY COUNTRY'S LEADING GAS UTILITIES

HEREMETAL Flue Liners have proved their superiority and are being used in more installations and conversion jobs because of the economical showing in fuel savings; the ease with which they are installed and the protection given to masonry and chimney.

A checkup of the chimneys in your neighborhood needing repairs will show you the profit you can make by installing HEREMETAL flue liners.

An actual photograph showing the effect of condensation and corrosion upon masonry and chimney, without liner.

THE HEREMETAL COMPANY
MINNEAPOLIS
MINNESOTA

Write today
FOR FULL INFORMATION

No. 18 Hand Power

Speed Up PRODUCTION

Here's just the Shear that offers every feature you want. It does hundreds of odd shearing jobs better and faster—yet is an inexpensive hand operated tool.

MARSHALLTOWN THROATLESS SHEARS

★CUT ANY SHAPE
★ANY SIZE SHEET

No matter what type of cutting—either irregular shapes or straight splitting — from ANY size sheet, you'll quickly find that the Marshalltown Throatless Shear is the most profitable tool in the shop.

Send at once for Shear Bulletin. It gives all details of the Marshalltown line of sizes from 18 gauge to ½ inch capacity.

MARSHALLTOWN MFG. COMPANY
920 E. Nevada St., Marshalltown, Iowa

When Sheet Metal Departments are BUSIEST — They NEED . . .

LIBERT Hi-Speed SHEARS

The busier you are, the more you'll appreciate a LIBERT. Its high speed, versatility, accuracy, permits a wider variety of work—and saves time, labor, and money on every job. Shears CLEAN, avoiding any need for time-wasting finishing. Some men are boosting production by shearing as many as 5 Steel Sheets AT ONE TIME—an example of LIBERT'S Capacity! Ask for a demonstration, or latest bulletin.

☆ (Illustrated) One of eight Libert Shears at North American Aviation Plant, Inglewood, Calif.

LIBERT MACHINE COMPANY
Green Bay, Wisconsin

Manufacturers of Shears since 1915

Libert Hi-Speed SHEAR

NEW AIR CONDITIONING REGISTERS

The New Rock Island line of Air Conditioning Registers now shown in complete new catalogue just off the press.

No. 822 Wall Register---Horizontal Vanes

The New Rock Island Air-Vane Registers are of bar type fabricated construction—Attractive Appearance—Rigid Construction—Vertical or Horizontal Vanes—Simple, secure adjustment.

Dealers Net Estimating Book, a time and money saver, gives full particulars, prices, etc.

Mail Coupon Today

ROCK ISLAND REGISTER CO.
Rock Island, Ill.

Gentlemen:
Please mail me a copy of your dealer's net estimating book.

Name .....
Street Address .....
City & State .....

Sales are Increased In Dollar Volume
with a
GRAND RAPIDS
FURNACE CLEANER
Free Trial
Convenient Terms

Write for Details
DOYLE VACUUM CLEANER CO.
227 STEVENS ST., S. W. GRAND RAPIDS, MICH.

The "QUALITY" *Nail!*
DENISTON
TRIPLE LOCK LEAD SEAL
ROOFING NAILS
Look at it! . . . You can SEE the superiority of this nail! The lead, under the head and down the shank, plugs the hole around the nail with lead to form a weatherproof seal . . . the "bump" triple-locks nail, lead and sheet solidly together . . . when the nail is driven through sheet metal roofing the drive screw shank gives greater holding power than even the Deniston ring shank nail. No loosened roofing, no leakage. Insure QUALITY roofing jobs with Deniston QUALITY Nails. Full details and prices, with samples and demonstrator blocks, FREE.

The DENISTON *Co.*
4856 SO. WESTERN AVE., CHICAGO

Bremil

PORTABLE SHEARS
Your work will proceed faster and neater when you use Bremil Portable Shears on the job or in the shop. Write today for literature showing complete line. Prompt shipment can be made from stock.
ALL-ALLOY No. 2 cuts up to ¼" steel plate.
ALL-ALLOY No. 1 cuts up to No. 11 gauge strip or sheet.
Special blades may be obtained for shearing stainless steel.
BREMIL MFG. CO., ERIE, PA.

Repair parts
FOR ALL HEATING UNITS
BRAUER
REPAIR PARTS
STOVE FURNACE BOILER
OIL STOVE RANGE
A. G. BRAUER SUPPLY CO.
Distributors of All Heating and Air Conditioning Equipment
2100 Washington Ave. St. Louis, Mo.

shearing in all its phases, doing work by mallet and by an assortment of hammers, flanging over a stake, hammer-finishing marred metal. Their liking for hand exertion in this work undoubtedly will lead to an expertness in the handling of tools qualifying them for benchwork and "fitting" of which there is considerable quantity to be done in any sheet metal shop.

Competent fitters are scarce. The more so, because the work of "fitting" has grown to include assembly, the fitting-in of doors and of mechanism parts, of electric connections, of locks, of prefabricated hinges, of decorative mouldings and of a vast variety of other items which are not exactly sheet metal work but which more and more are identified with it.

In shops in which shearing, provisioning, braking-forming and joining is being done by specialized machine operators, there is room for men who can work at the bench and do fitting. This work has been done by the old-time mechanic largely by the tinsmith, the coppersmith, the man who has been doing sheet metal work by ingenious use of tools in his hands. These "fitters" are fast disappearing from the shop. They have reached the retirement age or are engaging in small businesses of their own.

The Vocational Training Instructor, even under the Emergency Short Course Training, is expected to produce a new crop of workmen to take the place of the retiring bench worker and fitter. Alongside of the shearman and provisioner and brake-former and joiner he is to train men adept at handling tools and able to do a variety of work by hand. The instructor must be alert at discovering, among the twenty-odd students, one or two of the young men whose inclination is towards doing work by the handtool. Such men he should not waste at the easier learned tasks of shearing, provisioning, brake-forming. But he should take especial notice of the one or two, leading them on to acquire tool-dexterity.

◆

"Do's" and "Dont's" For Stainless

(*Continued from page* 74)

than 20 or 22 gauge is recommended where appearance is a factor. These heavier gauges will help eliminate the wrinkles that unfortunately give such a "tinny" effect to the lighter weights.

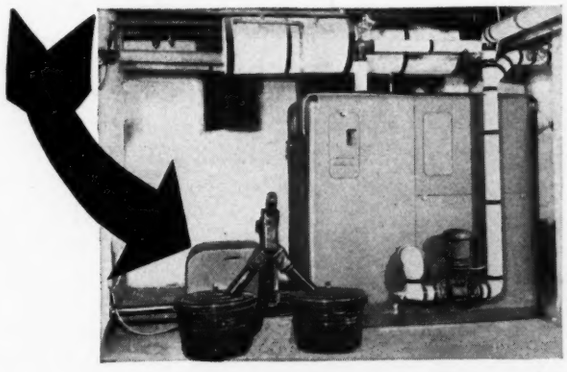
It is this writer's belief that stainless steel is revealed to the fullest extent of its beauty on rounded surfaces. Here the highlights and shadows have an opportunity for complete, rich play. These rounded surfaces, where possible, should, for best results, be smooth and unbroken in design.

Boom Year for Domestic Stokers!

It's a ripe market for a good stoker line. And, the FREDERICK line supplies a stoker for each of the varied problems you encounter in residential heating—and in commercial installations, too.

Volume priced and mechanically simple, FREDERICK STOKERS have every feature for comfort and convenience and economy in operation . . . competition is met—or excelled.

Ask about them. Complete information about the stokers and the liberal Frederick Profit Plan sent promptly on request (on your letterhead) to The FREDERICK IRON & STEEL COMPANY, East Street, Frederick, Maryland.



Frederick **STOKERS**

Bituminous or Anthracite . . . Made by Frederick—builders of good stokers for 23 years.

LOOK INTO A COMPLETE SYSTEM OF VENT PIPING

13 YEARS OF PIONEERING

And practical experience in manufacturing Vitroliner, the superior vent pipe. Used extensively on low cost housing projects.

Vitroliner used with Fyrex insulation eliminates the standard masonry chimney. It consists of lengths of acid resisting vitreous enamel coated steel pipe and fittings, with choice of four roof types of Vitroliner chimneys. This system of outlet and vent piping can be installed inside of partitions or walls. Provides an adequate means for venting gas, oil, or coal appliances.

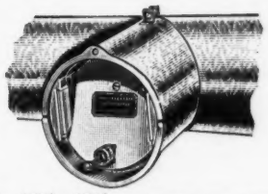
Write for further details.

CONDENSATION ENGINEERING CORPORATION

2515 ARCHER AVENUE
CHICAGO, ILL.
PHONE CALUMET 4362

DRAFTED BY UNCLE SAM

TO HELP CONSERVE THE NATION'S FUEL



Field Draft Controls are being installed extensively by Uncle Sam to help conserve important fuel. In domestic and commercial installations alike fuel savings of 8%, 10%, 12% or more are common with the Field Control. The complete Field line helps you cover your entire market.

6" TYPE "U"

Write for details on this 6" Type U for space heaters. Also on the Motorized — designed for maximum fuel economy. They're part of the more complete, more accurate Field line.

MOTORIZED

FIELD CONTROL DIVISION MENDOTA, ILLINOIS

Come and Get 'Em

LIFETIME Warm Air Furnace

Anticipating a possible shortage of materials, we have built up an inventory of Warm Air Furnaces. If you need furnaces now or will need them later, get in touch with us at once.

A Complete Line

We offer a full line of modern Warm Air Furnaces including the 900 Series, which is a truly competitive line. Made by one of the largest and oldest manufacturers with a yearly capacity of 25,000 furnaces, the name Royal stands for quality.

HART & CROUSE

CORPORATION

301 TURNER STREET UTICA, NEW YORK

Non-Uniform Bonnet Temperatures

(*Continued from page 62*)

in Fig. 3, which is a front view of a conventional steel furnace. This will direct the air over the hot spot above the pouch.

Side views of baffles (a) and (b) are shown as dotted lines. At this point it is well to bring out the fact that with the conventional centrifugal blower about 60% of the air passes through the lower one-third of the blower outlet, so that in determining the length of baffles (a) and (b), be sure that they are long enough to catch the amount of air necessary.

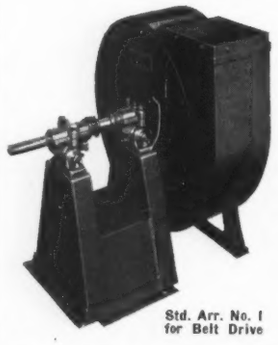
Fig. 4, covering the verticle, multiple radiator gas furnace, of which there are numerous variations, shows the blower discharging at the side of the sections. As these sections are usually raised about 6 inches above the floor of the furnace, the blower blows completely through and up the further side of the furnace, with the greatest percentage of air passing either between the casing and the farthest section or around the farthest section. Baffles shown as dotted lines at (a) and (b) are the simplest method of correcting this type of furnace. Keep in mind that the greatest amount of air must go *between* two heated sections and that very little air is required between the outer section and the casing.

"High Boy" Problems

Where the air is discharged from below up through the sections, the problem of the higher velocity being at the lower one-third of the blower outlet requires a baffle attached to the blower outlet, which will spread this air over the heating sections evenly, as shown in Fig. 5. However, the leading edge of this baffle, which is cutting the air, should be folded over so as not to present a sharp edge which will whistle, as the velocity at this point is very high. This same baffle can be used where the delivery is from the rear.

The conventional top radiator cast iron furnace seldom presents a baffling problem other than some type of baffle to throw air *at* the firepot where the dead air area is created between the top of the ash pit and the bottom of the feed pouch and above the feed pouch, as shown in Fig. 6. The baffle should be placed so that the air is directed one way through this opening, and will be determined by the location of the blower, as two baffles catching air from both sides will neutralize the effect of each other.

There are numerous furnace designs on the market which are simple and efficient and cause no difficulty with uneven bonnet temperatures. There are, however, a tremendous number of unusual designs, in which the design engineer has

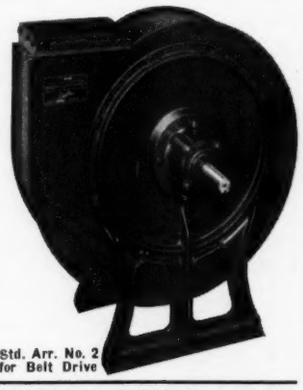


Std. Arr. No. 1 for Belt Drive

New and improved "EX" Fans are now available in standard sizes from No. 15 to No. 80 and from 200 to 30,000 CFM Capacity with pressures up to 15" W.G. These fans are commonly used for exhaust problems to handle dust, fumes, shavings, etc., but can be adapted for forced draft service.

"EX" Fans are furnished in all standard arrangements of the N.A.F.M. The design is such that it can be easily modified to suit special assemblies, thus "EX" Fans are ideal for resale purposes as part of factory assembled units.

Write us about your problem. Send for Bulletin No. EX-41



Std. Arr. No. 2 for Belt Drive

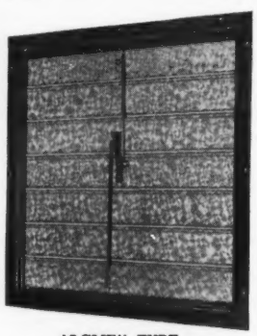
BAYLEY BLOWER COMPANY, 1817 South 66th Street, MILWAUKEE, WISCONSIN

Elgo Ventilating Specialties

Newest Thing In Automatic Shutters

Constructed with steel louvers instead of aluminum, and operated by a patented spring mechanism that makes the louvers open easier and wider, and makes them snap tight shut when the air current stops. Tension adjustable for different air velocities. No flapping or flutter.

Write for circular and prices!



"ACME" TYPE AUTOMATIC SHUTTER Rear View (Closed)

Free CATALOG

ELGO SHUTTER & MANUFACTURING CO.
6966 W. Jefferson Detroit, Mich.

CHICAGO STEEL BRAKE

BEST BY FORTY-TWO YEARS TEST

DREIS & KRUMP MFG. CO.
7404 LOOMIS BLVD. CHICAGO

AT THE TOP OF THE MAST FOR 30 YEARS

THARCO ASBESTOS FURNACE CEMENT

WITH National Defense placing emphasis on fuel saving, home owners will demand more of their furnace than ever before. Many furnaces will need repairs. The next time you get a furnace repair job remember THARCO. It's the one furnace cement you can always depend upon to give satisfactory results.

MANUFACTURED ONLY BY
THE ARMSTRONG COMPANY
DETROIT DALLAS CHICAGO

G&O COILS

Detail of mechanical joint used in Universal Heat Transfer Coils.

FOR HEATING AND COOLING IN A WIDE RANGE OF SIZES

Send for Catalog

THE G&O MANUFACTURING COMPANY
New Haven, Connecticut
Pioneer Manufacturers of Square Finned Tubing in the United States

COPPER
BRASS
BRONZE
Perforated to your requirements
Send us your drawings for price

PERFORATED METALS

For all industrial uses

ALL SIZE AND SHAPE HOLES
ALL METALS

DIAMOND MFG. CO.
BOX 29 WYOMING, PA.

FLUE COLLARS

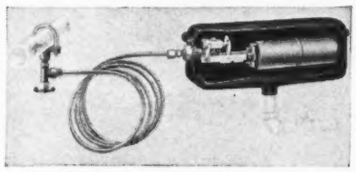
Commercial Pressed Steel Flue Collars are used to form the connection between the furnace belt and the radiator. They are of sufficient diameter to permit of lining with a cast iron screen so as to keep the excessive temperature of the flue gases from coming in direct contact with the other connection.

These collars are drawn in one piece and their ends can be welded into the shell of the furnace belt and radiated giving a gas pipe joint.

Horizontal flanges are uniform smooth. Holes are all punched at one time; and, with the insertion of a gasket, a gas pipe joint is easy to make. The length of these collars is sufficient to give proper air space between the radiator and the dome and yet allow plenty of room for bolting together.

THE COMMERCIAL SHEARING & STAMPING CO.
YOUNGSTOWN, OHIO

The valve that MAKES HUMIDIFICATION UNFAILING



HERE'S a float valve that you can depend upon. Its patented "snap action" knows only two positions—wide-open or tight-closed. The wide-open flow prevents plugging and the tight closure prevents flooding. Use it where other valves have failed and see the difference!

McDONNELL & MILLER
1318 Wrigley Building, Chicago, Ill.

The McDONNELL Humidifier Water Control

PERFECT PERFORMANCE *in limited wall spaces!*

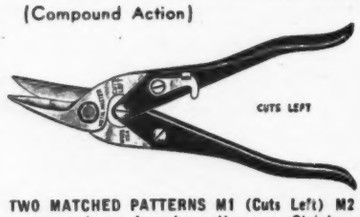
AN EXCLUSIVE R&G FEATURE: Moving parts rotate on BRASS bearings; rust and clogging minimized!

Write today for descriptive circulars

REGISTER & GRILLE MFG. CO., Inc.

70 BERRY STREET, BROOKLYN, N. Y.

WISS "METAL-MASTER" SNIPS
(Compound Action)



"TWICE THE WORK WITH HALF THE EFFORT"

TWO MATCHED PATTERNS M1 (Cuts Left) M2 (Cuts Right) Cut circles, squares and any irregular patterns on Stainless, Dural and Monel Metals with the greatest of ease. Jaws of wear-resisting Manganese Molybdenum Steel. Handles hot-pressed from tough Chrome Vanadium Steel. Nickel steel bolts and nuts to Government specifications. All parts interchangeable. Detachable rubber handle grips at slight extra cost.

J. WISS & SONS CO.
ESTABLISHED 1848 NEWARK, N. J.

JOHNSON
No. 118 Combination Bench Furnace
Needs No Forced Air Blast

For tempering, annealing, case-hardening or soft-metal melting, and for heating the largest soldering coppers, branding or stenciling irons. Heavily lined firebox. Removable lid permits using 22 lb. capacity melting pot.

Write for Free Catalog and Prices.

JOHNSON GAS APPLIANCE CO. Cedar Rapids IOWA
609 E Ave. NW. OUR 40TH YEAR

paid a great deal of attention to flue travel, making the gas passage as tortuous as possible to extract the heat and then has just shoved a blower through the casing and offered up a prayer that the air would find the hot spots and wipe them cool.

This article has attempted to point out why perfect duct installations do not always function. One other great source of trouble—improper take-offs on trunk lines—will be covered in another article.

◆

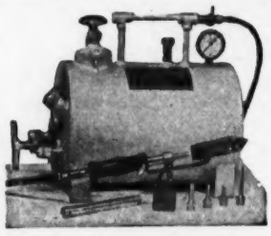
Radiant Baking Organic Finishes

(*Continued from page 67*)

The finishes used in radiant heat baking should be specially formulated in order to secure best results.—Not only should the kinds of finishes used in radiant heat baking be carefully selected, but those employed should be specially formulated to suit the requirements of the process. This subject will be discussed more fully later.

Baking temperatures above 600° F. can not be obtained with radiant heat baking.—This limitation is important for certain baking processes, such as vitreous-enamel baking, but no organic finishes require baking temperatures beyond the range of this process.

REINER SOLDERING and BRAZING OUTFIT



Will Cut Soldering Costs in Half.
No More Changing of Irons.
A hot iron in one minute from cold start.
Always the Right Amount of Heat for the lightest as well as the heaviest soldering jobs.

QUICK SET DIVIDERS
Now manufactured by Reiner & Campbell Co., Inc. Quick Set Dividers—fastest and most accurate on the market—two sizes for circles up to 36" and 48". Guaranteed—Order Now!

REINER & CAMPBELL CO., Inc.
667 Norwood Terrace, Elizabeth, N. J.

QUIET-AIRE *Blowers*

★
No Increase in Prices
★
Prompt Delivery
★

Patented motor mounting; self-aligning, self-lubricating bearings guaranteed 5 years. Super capacity and exclusive features build sales. Write

MAPLE CITY STAMPING CO.
PEORIA, ILLINOIS

Statement of the Ownership, Management, Circulation, Etc., Required by the Acts of Congress of August 24, 1912, and March 3, 1933

Of American Artisan, published monthly at Chicago, Ill., for October 1, 1941.

State of Illinois, County of Cook, ss: Before me, a Notary Public in and for the State and county aforesaid, personally appeared F. P. Keeney, who, having been duly sworn according to law, deposes and says that he is the business manager of the American Artisan, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March 3, 1933, embodied in section 537, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher, Keeney Publishing Company, Chicago, Illinois.
Editor, J. D. Wilder, Chicago, Illinois.
Managing Editor, J. D. Wilder, Chicago, Illinois.
Business Managers, F. P. Keeney, Chicago, Illinois.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.)

Keeney Publishing Company, 6 N. Michigan Ave., Chicago, Illinois. Stockholders: F. P. Keeney, Chicago, Illinois; W. J. Osborn, Fairfield, Conn.; R. Payne Wettstein, Chicago, Illinois; Chas. E. Price, Chicago, Illinois; Robert A. Jack, Cleveland Heights, Ohio.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.)

None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the twelve months preceding the date shown above is ——. (This information is required from daily publications only.)

F. P. Keeney,
Business Manager.

Sworn to and subscribed before me this 25th day of September, 1941.
(SEAL) Grace E. Waymire, Notary Public.
(My commission expires February 10, 1942.)

TRY US FOR QUICK DELIVERY

Sheet Metal Fabricating

MACHINES & TOOLS

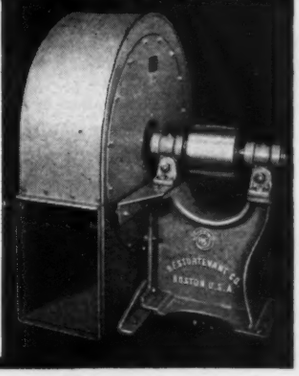
Write for Catalog and New Bulletin No. 53

WARD MACHINERY CO.
564 W. Washington Boulevard
Chicago, Illinois

MILL EXHAUSTERS

1. Designed and built by the **Pioneer** exhauster manufacturer.
2. Result of over 80 years of air engineering experience.
3. High efficiency assures low power consumption.
4. Sturdy construction assures dependable service.

Write for Catalog No. 430
B. F. STURTEVANT CO.
HydePark, Boston, Mass.
Branches in Principal Cities



The All Purpose
AIR VELOCITY METER
Alnor VELOMETER
INSTANTANEOUS DIRECT READING
ASK FOR BULLETIN 2650D

Illinois Testing Laboratories Inc.
412 N. La Salle St., Chicago, Ill.

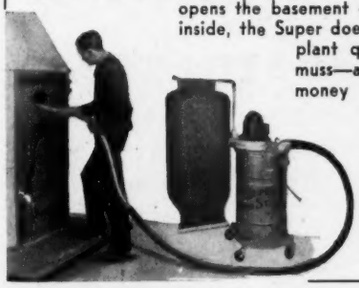
PEERLESS REPAIR PARTS MAKE PROFITS FOR DEALERS

The shortest road to a profitable furnace business is in being able to make prompt repairs of old furnaces at reasonable cost. PEERLESS dealers in new furnaces have the largest stock of furnace repair parts (all makes, all ages) in the central states, at their command. Complete line of new furnaces and winter air conditioning units at popular prices. Write for dealer proposition and repair parts catalog.

PEERLESS FOUNDRY CO., 1853 Ludlow Ave., INDIANAPOLIS

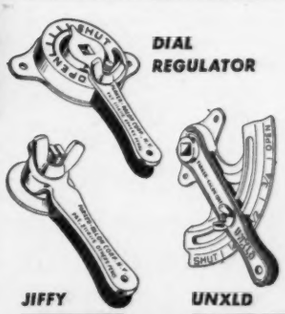
Leads You To 'em Then Does The Work

Your Super Red Streak Furnace Cleaner digs up prospects for repairs, re-sets, new grates, pipes—even new plants. The Super opens the basement door for you. Then when inside, the Super does the work and cleans the plant quickly, easily, no fuss, no muss—and profitably. You make money and a steady customer even if cleaning is all you do. Try a Super 5 days free and see for yourself. All risk ours. Write now.



THE NATIONAL SUPER SERVICE CO.
1944 No. 13th Street
Toledo, Ohio

A Type And Size For Every Need

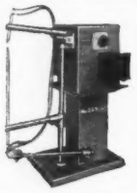


For efficiently controlling light and medium dampers in heating, ventilating and air conditioning systems, specify Parker-Kalon Damper Controls. The line includes all types and sizes, at a range of prices to fit the needs of any job. Parker-Kalon Corp., 190-192 Varick Street, New York.

PARKER-KALON damper controls

AMERICAN ARTISAN Service Section

WELDING HEADQUARTERS



Electric welding equipment of every description to weld from a watch case to a door. Special or standard SPOT WELDERS from ¼ to 500 K.V.A. A.C. Arc Welders from 100 to 400 Amps. We invite contract Spot Welding in large or small quantities.

EISLER ENGINEERING COMPANY
CHAS. EISLER, PRES.
761 S. 13th St. (Near Avon Ave.) Newark, N. J.

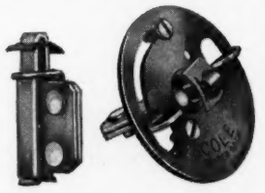
CLARAGE FANS FOR SALE

1—Type S. P. No. 60 Exhaust Fan
1—Type M. No. 5½ Ventilating Fan
47,520 C. F. M.

These are used fans in good condition.
Priced Reasonable

J. A. TEMPLE CO., 108 Parkway
Kalamazoo, Michigan

Cole
Damper Lock



★ Winter and Summer setting.
★ For square, round or Splitter damper.
★ No more damper rattles.
★ Fool proof—Low Cost.
★ Write for your free sample.

Cole-Sullivan Eng. Co.
1316 N. 3rd St. Minneapolis, Minn.

Better for Every Spraying Purpose
MARLEY SPRAY NOZZLES

"Tops" for Air Washing, Humidifying, Brine Spray Lofts, etc. Marley nozzles lead all in sales and in profits to you.

★ Finer, more uniform spray.
★ Effective operation at Low Pressures saves on pumping cost.
★ No internal parts to clog or wear. ★ Longer life, superior materials and workmanship.

MARLEY CO. Write for Literature Now! Kansas City, Kansas

SpeedWay

When you buy an Electric Concrete Drill it's 5 to 1 it will be a SpeedWay Hammer

The most profitable tool you can buy — saves most labor hours by making short work of tedious jobs. Goes through concrete, stone, brick, hard cement. 1800 powerful blows per minute. Handy, correctly balanced, weighs only 26 lbs., yet takes drills up to 1¼" diameter. Built for 20 year service. More SpeedWays in use than of all other makes put together.

SPEEDWAY MFG. CO.
1856 S. 52ND AVE. CICERO, ILL.

Save Money, Time and Muscle

Drill Concrete with the "Do-All" Combination Electric Hammer and Drill. Set expansion bolts 10 to 20 times faster than with hand tools. Drills concrete, brick, stone, metal, wood. Easy to maintain. Weighs 15 lbs. Drills to 1⅝" in concrete. 2400 blows per min. Bulletin 400. Phone Austin 9866.

WODACK ELECTRIC TOOL CORPORATION
4644 W. Huron St., Chicago, Ill.

Trademark
YAGER'S Soldering Salts — Paste
Reg.

Two standard fluxes for all soft soldering. Safe, quick, certain. Buy them at your jobbers or write us if he cannot supply you.

½ lb., 1 lb., 5 lb. cans; 2 oz., 6 oz., 12 oz.

ALEX. R. BENSON CO., INC., HUDSON, N. Y.

√ Accurate
√ Convenient
√ Complete

. . . That's the story behind the success of AMERICAN ARTISAN'S Annual Directory and Show Number to be published next January. Its completeness, accuracy and convenience have made it indespensible to engineers and contractors throughout the year for reliable reference in their buying and specifying work. Further information sent on request.

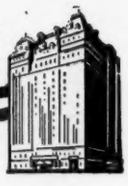
KEENEY PUBLISHING COMPANY
6 North Michigan Ave. Chicago, Ill.

The BELLEVUE "One of the Few Famous Hotels in AMERICA"

★ announces, as 1941 autumn news . . . hundreds of rooms and baths modernized . . . a beautiful, new, completely air-conditioned Coffee Shop—seating 400, open from early breakfast to late supper, featuring finest food, modern service at really popular prices. Other air-conditioned restaurants. Unsurpassed facilities for comfort and the enjoyment of true Philadelphia hospitality. Reasonable rates.

★ BELLEVUE-STRATFORD
IN PHILADELPHIA

CLAUDE H. BENNETT
General Manager



AMERICAN ARTISAN Service Section

The Electric City Gutter Former

MAKE YOUR OWN GUTTER AS YOU WANT IT
Easily and quickly operated. Soon pays for itself.

REPLACEMENTS
Beading Rods, Handles, Rolls, etc., quickly furnished.

STERLING BEADER
A simple and inexpensive machine for forming round bead.

F. L. ROBERTSON
58 RANO STREET BUFFALO, N. Y.

RUBBER SHOES FOR LADDERS
- PREVENT SLIPPING
- MAKE CLIMBING SAFE
- *Send in Your Order Today*

$1.80 per pair
You will like them

JOHNSON LADDER SHOE CO. EAU CLAIRE, WIS.

THEY PAY THEIR WAY!

7 SEVEN — No. 12 SMITH'S CLEAT BENDERS IN ONE SHOP, IS THE ANSWER!

—This shop and many others have found that the mechanic skilled enough to make a perfect cleat edge on the end of pipe or fittings with ordinary hand methods, is too valuable for this work!

A TRIAL SHOULD CONVINCE YOU!

—Your dealer is ready to let you try a No. 12 (twelve inch) or the New No. 18 (eighteen inch) SMITH'S CLEAT BENDER, at no obligation to you. . . . Make an honest comparison between this better way and any method you are now using. Results should prove that you also can make them PAY THEIR WAY.

WRITE FOR NEAREST DEALER STOCKING THEM

R. E. SMITH
1521 GARDEN PL. WAUKEGAN, ILL.

ALLEN NON-DULLING STAINLESS STEEL SODER

Where a close matching, non-dulling sodered joint is needed, as on decorative work, Allen Non-Dulling Stainless Steel Soder is the right product for the job. Comes in wire form only. Ideal for sodering purposes on new or modernized work where appearance counts! Send for free samples. Buy Allen Fluxes and Soders at your Jobbers.

L. B. ALLEN CO., Inc.
6702 Bryn Mawr Chicago, Ill

ALLEN "ALL-SOL" STAINLESS STEEL SODERING FLUX

Here's a remarkable, fast flux that makes the sodering of stainless steel as easy as sodering tin plate. (Also available in a special odorless formula where less strength is required.) "ALL-SOL" works with all soders quickly, cheaply and efficiently. Send for free samples. Buy Allen Fluxes and Soders at your Jobbers.

L. B. ALLEN CO., Inc.
6702 Bryn Mawr Chicago, Ill.

ALLEN EXTRA STRONG STAINLESS STEEL SODER

Allen Extra Strong Stainless Steel Soder gives joints of extra strength with great ease. The precise alloy needed for all-around sodering of stainless steel. Allen Extra Strong Stainless Steel Soder darkens slowly with age. Easily applied and conveniently carried in your kit. Send for free samples. Buy Allen Fluxes and Soders at your Jobbers.

L. B. ALLEN CO., Inc.
6702 Bryn Mawr Chicago, Ill.

JOHNSON'S NEW HANDY MANUAL on HEATING, VENTILATING MECHANICAL REFRIGERATION and AIR CONDITIONING

432 pages of practical, condensed information, tables, rules and diagrams. Price $1.00—Remit with order to

KEENEY PUBLISHING COMPANY
6 N. Michigan Ave., Chicago, Ill.

BLOWERS — FANS — EXHAUSTERS

THOROUGHLY REBUILT, for perfect performance. All types; all standard makes. All sizes including the big ones. Hundreds in stock, meeting all requirements. Attractive prices. Fully guaranteed. Expert engineering counsel. GENERAL BLOWER CO., Engineers, 403 North Peoria Street, Chicago, Illinois.

INTERSTATE HAS IT!

Make "Interstate" All Types

Your Headquarters All Sizes

METAL FABRICATING MACHINERY
MACHINE TOOLS
SHEET METAL MACHINERY
STRUCTURAL STEEL MACHINERY
PRODUCTION MACHINERY
PRESSES

QUICK DELIVERY
FOR YOUR IMMEDIATE NEEDS
"SEND FOR OUR LATEST CATALOG"

HELP THE DEFENSE PROGRAM
Release NOW your surplus machinery or trade it in for INTERSTATE'S new or reconditioned machines

INTERSTATE Machinery Co., Inc.
1933 W. PERSHING RD. • TEL. YARDS 5800 • CHICAGO, ILL.

Classified

SITUATIONS OPEN

Wanted by manufacturer: Salesman to handle filters for furnaces and air-conditioning equipment on a commission basis. Advise territory and present connections. Write Key No. 547, American Artisan, 6 No. Michgan Ave., Chicago, Ill.

SITUATIONS WANTED

Would like sub-contracts in sheet metal work, either defense or private. Have fully equipped shop, includng 10 ft. brake. Address Ralph Glover, Southold, New York.

FOR SALE

FOR SALE—Only warm air heating and ventilating business in a town of 30,000. Shop is fully equipped for light sheet metal and furnace jobs. Located in Eastern North Carolina. Address Key No. 548, American Artisan, 6 No. Michigan Ave., Chicago, Ill.

WANTED

WANTED—Patterns for a line of cast iron furnaces. Address Key No. 546, American Artisan, 6 No. Michigan Ave., Chicago, Ill.

The American Artisan Service Section presents a golden opportunity to contact a national circulation at comparatively small cost. Manufacturers can use it to make any article sell and dealers will find it an inexpensive way to contact a live buying trade. Don't delay—send in your copy now for the next issue See bottom of page for rates.

SERVICE SECTION: Rates for display space similar to above in Service Section are $5.00 per inch per insertion. One-inch minimum space accepted. **Classified Section:** Rates for classified advertising are 5 cents for each word including heading and address. Count seven words for keyed address. Minimum $1.00 for each insertion. Cash must accompany order.

Index to ADVERTISERS

Acme Electric Welder Co.....108
Adams Co., The..... 87
Aerofin Corp. ..... *
Aeroil Burner Co., Inc..... *
Air Controls, Inc. ..... *
Air Controls Products, Inc..... 26
Air-Maze Corp. 105
Airtemp Division, Chrysler Corp.....
.....19 and 20
Airtherm Mfg. Co..... *
Aldrich Co. 108
Allen Co., Inc., L. B.....119
Allen Corp. ..... *
American Air Filter Co., Inc..... 42
American Brass Co. 29
American Radiator & Standard
Sanitary Corp. ..... *
American Rolling Mill Co., The..... *
Apollo Metal Works.....110
Armstrong Co., The.....115
Auer Register Co..... 22
Automatic Humidifier Co. 97
Automatic Products Co. 94

Barber Gas Burner Co., The.....106
Barber-Colman Co. ..... *
Bard Mfg. Co..... *
Bayley Blower Co.....114
Bellevue-Stratford Hotel 118
Benson Co., Inc., Alex R.....118
Berger Bros. Co.....110
Bethlehem Steel Co..... 79
Blocksom & Co.....110
Brauer Supply Co., A. G.....112
Bremil Mfg. Co.....112
Burt Mfg. Co..... *

Carnegie-Illinois Steel Corp..... 8
Century Electric Co..... 18
Cincinnati Sheet Metal & Roofing Co. *
Clarage Fan Co.....109
Cole-Sullivan Engineering Co.....118
Commercial Shearing & Stamping Co.115
Conco Corp. ..... *
Condensation Engineering Corp.....113
Cook Electric Co.....Inside Back Cover
Crescent Tool Co..... 23

Delco Products Corp..... *
Deniston Co. 112
Detroit Lubricator Co..... 12
Diamond Mfg. Co.....115
Doyle Vacuum Cleaner Co.....112
Dreis & Krump Mfg. Co.....114

Eisler Engineering Co.....118
Electric Vacuum Cleaner Co., Inc.....110
Elgo Shutter & Mfg. Co.....114
Essick Mfg. Co..... *

Field Control Division.....113
Fitzgibbons Boiler Co., Inc..... 27
Frederick Iron & Steel Co.....113
Front Rank Furnace Co..... *
G & O Mfg. Co.....115
Gehl Bros. Mfg. Co..... 97
General Blower Co. 119
General Controls 109
General Electric Co. ..... *
Gerett Corp., M. A..... *
Grant Wilson, Inc..... 89

Harrington & King Perforating Co... 94
Hart Cooley Mfg. Co..... 9
Hart & Crouse Corp.....113
Henry Furnace & Foundry Co., The.. 14
Heremetal Co., The.....111
Hess Warming & Ventilating Co.....105
Hussey & Co., C. G..... *

Illinois Testing Laboratories, Inc.....117
Independent Register Co., The.....108
International Heater Co. 90
International Nickel Co., Inc..... 5
Interstate Machinery Co.....119

Johnson Co., S. T..... *
Johnson Gas Appliance Co.....116
Johnson Ladder Shoe Co.....119

Lamneck Products, Inc.....
.....Inside Front Cover
Laclede-Christy Clay Products Co..... *
Lau Blower Co..... 10
Leader Iron Works, Inc.....103
Libert Machine Co.....111
Lincoln Electric Co..... *
Lockformer Co. 21

Maid-O'-Mist, Inc. 92
Maple City Stamping Co.....116
Marley Co., The.....118
Marshalltown Mfg. Co.....111
May-Fieberger Co. 102
McDonnell & Miller.....116
Mercoid Corp., The..... *
Meyer & Bro. Co., F..... 16
Meyer Furnace Co..... *
Milcor Steel Co.....Outside Back Cover
Minneapolis-Honeywell Regulator Co. *
Monmouth Products Co.....106
Morency-Van Buren Div., Scovill
Mfg. Co. 102
Morrison Steel Products, Inc..... 99
Mueller Furnace Co., L. J..... *

National Super Service Co.....117
Niagara Machine & Tool Works..... 88
Norge Heating & Conditioning Div.,
Borg. Warner Corp..... *
Northwestern Stove Repair Co..... 98

Olsen Mfg. Co., C. A..... 24
Osborn Co., J. M. & L. A..... 6
Owens-Corning Fiberglas Co..... 85

Pacific Gas Radiator Co.....101
Parker-Kalon Corp. 117
Payne Furnace & Supply Co.....104
Peerless Electric Co., The..... 25
Peerless Foundry Co. 117
Penn Electric Switch Co..... *
Perfex Corp. 11
Premier Division, Electric Vacuum
Cleaner Co., Inc.....110
Premier Furnace Co..... *

Quincy Stove Mfg. Co.....107

Randall Graphite Products Corp..... 15
Register & Grille Mfg. Co.....116
Reiner & Campbell, Inc.....116
Republic Steel Corp..... 30
Research Products Corp.....104
Robertson, F. L.....119
Rock Island Register Co.....111
Round Oak Co..... *
Rybolt Heater Co..... 7
Ryerson & Son, Inc., Joseph T..... 3

Sall Mountain Co..... 91
Sampsel Time Control, Inc..... *
Schwitzer-Cummins Co. 103
Scovill Mfg. Co.....102
Scully Steel Products Co..... 80
Skuttle Sales Co.....109
Smith, R. E.....119
Speedway Mfg. Co.....118
Standard Stamping & Perforating Co. 96
Stanley Electric Tool Div., The
Stanley Works 93
Sturtevant Co., B. F.....117
Superior Sheet Steel Co..... 64
Surface Combustion Corp..... *
Swartwout Co. 100

Temple Co., J. A.....118
Torrington Mfg. Co..... *
Tuttle & Bailey, Inc..... *

U. S. Air Conditioning Corp..... 95
U. S. Register Co. 13
U. S. Steel Corp. 8
Utility Fan Corp..... 87

Victor Electric Products, Inc.....109
Viking Air Conditioning Corp.....101
Viking Mfg. Corp. ..... *

Wagner Electric Corp..... *
Ward Machinery Co.....117
Waterloo Register Co.....107
Weirton Steel Co..... *
Westinghouse Electric & Mfg. Co..... *
White Mfg. Co..... 98
White-Rodgers Electric Co..... *
Whitney Mfg. Co., W. A..... 96
Whitney Metal Tool Co..... 99
Williamson Heater Co..... 95
Willis Steel Corp..... *
Wilson, Inc., Grant..... 89
Wise Furnace Co..... *
Wiss & Sons Co., J.....116
Wodack Electric Tool Corp.....118

Zink Co., John.....100

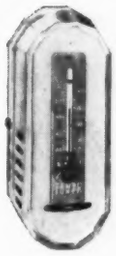
Firms represented in this issue are identified by the folio of the page on which their advertising appears. Advertising which appears in other issues is marked with an asterisk.

10 to 1 YOU ARE TRYING TO MAKE MONEY THE *Hard way*

ARE you battling for business when you could be making big money easily? Sell what 10 out of 11 of your customers want and can afford to buy—simplified, dependable, economical temperature control for hand fired heating plants.

Let us show you how you can make quick sales and substantial profits by selling the Cook line of Simplified Temperature Control Systems. You'll be selling controls that have everything in their favor—quality construction, simple installation, perfect service and economical cost.

Write today for complete details on the Cook line. Ask us to show you how you have the opportunity to make 10 sales and 10 satisfied customers out of every 11 prospects you have! Mail the coupon today!



Cook "400" Heat Regulator Sets give you maximum installation convenience and profit and give your customers greater economy and satisfaction. Here are a few "400" features:

Syncro-Action for perfect synchronization of rate of combustion of any solid fuel with any heat requirements.

No danger of overheating or fire. Current failure or blown fuse causes safety feature to close draft and open check insuring complete safety.

Clutch puts damper arm in neutral position with draft and check closed for smokeless and gasless firing. No service. No gears to grind, no bearings to oil, no batteries to wear out. Guaranteed for five years.

The "400" Heat Control Set includes everything needed for quick, easy installation. Modern design and styling.

COOK ELECTRIC COMPANY,
2702 Southport Avenue,
Chicago, Illinois

Please send me at once FREE copies of "How to Sell Heating Appliances" and "Simplified Temperature Control."

Name _____

Address _____

City and State _____

COOK
TEMPERATURE CONTROLS

Appliance Division

COOK ELECTRIC COMPANY
2702 SOUTHPORT AVENUE • CHICAGO

"Remodel and Repair" get the GO Sign from Government *in defense areas*

MILCOR Points out Your Opportunity in the "Repair for Defense" Program

Since right now *defense* is first with the Nation, *"Repair for Defense"* should be first with you.

An adequate defense program reaches beyond the building of just ships and planes and tanks and guns. It also demands suitable housing for defense workers.

Therein lies your responsibility — and opportunity.

You can do your part in getting the job done — by joining the rest of the building and allied industries and the Federal Housing Administration in sponsoring the "Repair for Defense" campaign.

This new remodeling plan has as its immediate goal the conversion of structurally-sound old houses into multiple-family dwellings.

True, the industry can, and undoubtedly will, construct as many new homes as required in defense areas.

But the need today is for speed, economy, and conservation of vital materials. Therefore, the utilization of every available well-located home not now in full use is the sensible "short cut" to additional housing. There are many such residences almost everywhere.

A liberal FHA Pay-Out-Of-Income Plan — excepted from regular installment credit regulations — makes it worth-while for property owners to make repairs and improvements now.

There's plenty of forceful, colorful educational material available to you free of charge through FHA, to help you tell the public the whole story — and get *your* share of the remodeling jobs.

All in all, here's a set-up with everything it takes to put over the "Repair for Defense" program successfully.

Support this program wholeheartedly. Request your tie-up material from the *Division of Education, Federal Housing Administration, Washington, D.C.*

F-223

MILCOR's Position Today

Because steel is on the critical list of defense materials, we know perfectly well that we cannot carry on our business in a normal way. In the face of these facts, we are not forgetting our obligation to our regular trade — dependent, of course, upon existing restrictions. We understand their need for our products in order to keep their businesses operating and to provide employment for their people.

For the trade within defense areas we shall recognize preference ratings for Milcor Steel Building Products manufactured to government specifications — predicating shipments on the amount of raw materials available to us.

MILCOR STEEL COMPANY

MILWAUKEE, WISCONSIN CANTON, OHIO

CHICAGO, ILL. • KANSAS CITY, MO. • LA CROSSE, WIS. • NEW YORK, N. Y.
ROCHESTER, N. Y. • BALTIMORE, MD.

Sales offices in principal cities